FERRIS®

OPERATOR'S MANUAL

IS1500ZX Series

Zero-Turn Riding Mower



Model Number:	Description:		
5900822	28HP Briggs & Stratton Vanguard Engine	61" Cut	(IS1500ZXBV2861)
5900823	28HP Briggs & Stratton Vanguard Engine	61" Cut	(IS1500ZXBV2861 AUS/NZ)
5900900	28HP Briggs & Stratton Vanguard Engine	61" Cut	(IS1500ZXBV2861 CAL)
5900902	26HP Kawasaki Engine	61" Cut	(IS1500ZXKAV2661)
5900955	26HP Kawasaki Engine	52" Cut	(IS1500ZXKAV2652)
5900876	22HP Kawasaki Engine	52" Cut	(IS1500ZXKAV2252)
5900906	22HP Kawasaki Engine	52" Cut	(IS1500ZXKAV2252 CAL)
5900535	24HP Kawasaki Engine	61" Cut	(IS1500ZXKAV2461)
5900567	23HP Kawasaki Engine	52" Cut	(IS1500ZXKAV2352)
5900568	24HP Kawasaki Engine	52" Cut	(IS1500ZXKAV2452)
5900572	28HP Briggs & Stratton Cyclonic Engine	61" Cut	(IS1500ZXB2861)
5900590	26HP Briggs & Stratton Cyclonic Engine	52" Cut	(IS1500ZXB2652)

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BRIGGS & STRATTON POWER PRODUCTS GROUP, LLC.
5375 NORTH MAIN STREET
MUNNSVILLE, NY 13409
800-933-6175

5101968
Rev E

Thank you for purchasing this quality-built FERRIS product. We're pleased that you've placed your confidence in the FERRIS brand. When operated and maintained according to the instructions in this manual, your FERRIS product will provide many years of dependable service.

This manual contains safety information to make you aware of the hazards and risks associated with this machine and how to avoid them. This machine is designed and intended to be used and maintained according to the manual and operated by trained professionals for finish cutting of established lawns and is not intended for any other purpose. It is important that you read and understand these instructions thoroughly before attempting to start or operate this equipment. **Save these original instructions for future reference.**

PRODUCT REFERENCE DATA	
Unit Model Number	Unit SERIAL Number
Mower Deck Model Number	Mower Deck SERIAL Number
Dealer Name	Date Purchased
ENGINE REFERENCE DATA	
Engine Make	Engine Model
Engine Type/Spec.	Engine Code/Serial Number

See Page 11 for the location of Identification Numbers

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⚠ WARNING

Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.

⚠ WARNING

Battery posts, terminals, and related accessories contain lead and lead compounds — chemicals know to the State of California to cause cancer or reproductive harm. Wash hands after handling.

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NOTE: In this manual, "left" and "right" are referred to as seen from the operating position.

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Operating Safety

Congratulations on purchasing a superior-quality piece of lawn and garden equipment. Our products are designed and manufactured to meet or exceed all industry standards for safety.

Do not operate this machine unless you have been trained. Reading and understanding this operator's manual is a way to train yourself.

Power equipment is only as safe as the operator. If it is misused, or not properly maintained, it can be dangerous! Remember, you are responsible for your safety and that of those around you.

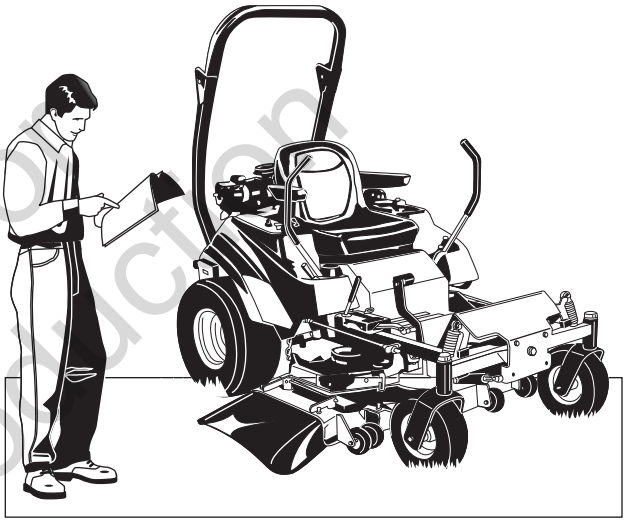
Use common sense, and think through what you are doing. If you are not sure that the task you are about to perform can be safely done with the equipment you have chosen, ask a professional: contact your local authorized dealer.

Read the Manual

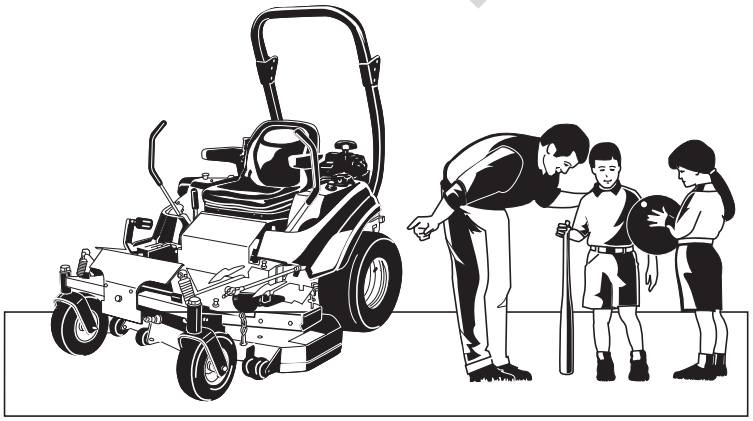
The operator's manual contains important safety information you need to be aware of BEFORE you operate your unit as well as DURING operation.

Safe operating techniques, an explanation of the product's features and controls, and maintenance information is included to help you get the most out of your equipment investment.

Be sure to completely read the Safety Rules and Information found on the following pages. Also completely read the Operation section.



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Children

Tragic accidents can occur with children. Do not allow them anywhere near the area of operation. Children are often attracted to the unit and mowing activity. Never assume that children will remain where you last saw them. If there is a risk that children may enter the area where you are mowing, have another responsible adult watch them.



Slope Operation

Operation on slopes can be dangerous. Using the unit on a slope that is too steep where you do not have adequate wheel traction (and control) can cause sliding, loss of steering, control, and possible rollover. You should not operate on a slope greater than a 5.4 foot rise over a 20 foot length (15 degrees).

Always mow across slopes, not up and down (to maintain traction on the wheels) and avoid sudden turns or rapid speed changes. Reduce speed and use extreme caution on ALL slopes.

Also, note that the surface condition you are on can greatly impact your ability to safely operate this machine. Operating on wet or slippery slopes can cause sliding and loss of steering and control. Do not operate on slopes that are slippery, wet, or have soft soil conditions.

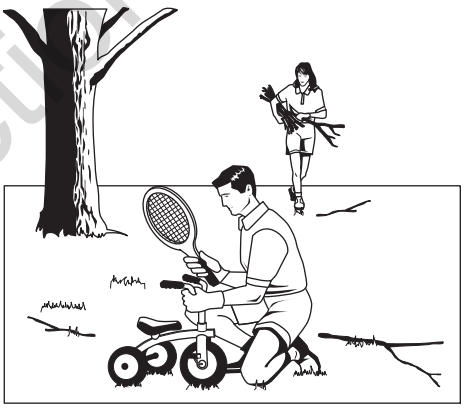
If you feel unsure about operating the unit on a slope, don't do it. It's not worth the risk.

Thrown Objects

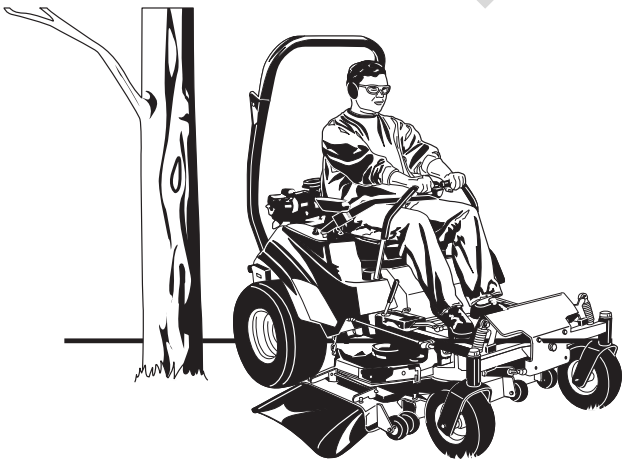
This unit has spinning mower blades. These blades can pick up and throw debris that could seriously injure a bystander. Be sure to clean up the area to be mowed and remove objects that could be thrown by the blade BEFORE you start mowing.

Do not operate this unit without the entire grass catcher or discharge guard (deflector) in place.

Also, do not allow anyone in the area while the unit is running! If someone does enter the area, shut the unit off immediately until they leave.



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Moving Parts

This equipment has many moving parts that can injure you or someone else. However, if you stay in the operator zone (stay seated in the seat), and follow the safety rules in this operator's manual, the unit is safe to operate.

The mower deck has spinning mower blades that can amputate hands and feet. Do not allow anyone near the unit while it is running! Keep safety devices (guards, shields, and switches) in place and working.

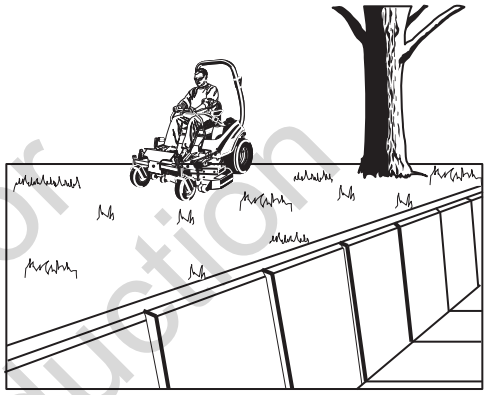
To help you, the operator, use this equipment safely, it is equipped with an operator-present safety system. Do NOT attempt to alter or bypass the system. See your dealer immediately if the system does not pass all the safety interlock system tests found in this manual.



Roll Bar Use

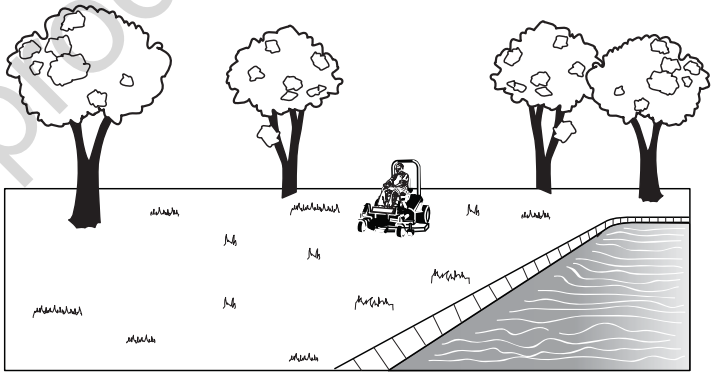
Keep the roll bar in the raised position and fasten the seat belt. There is no roll over protection when the roll bar is down! Do not jump off if the mower tips (it is safer to be secured by the seat belt with the roll bar raised.)

Lower the roll bar only when necessary (such as to temporarily clear a low overhanging obstacle) and NEVER remove it. Do NOT use the seat belt when the roll bar is down. Raise the roll bar as soon as clearance permits.

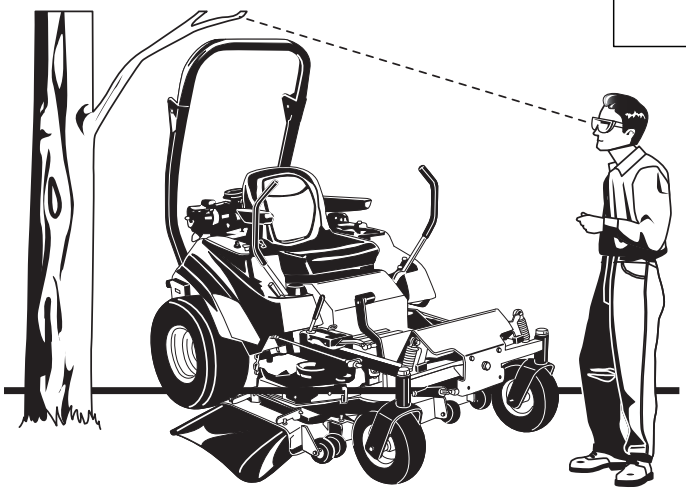


Retaining Walls, Drop-offs, and Water

Retaining walls and drop-offs around steps and water are a common hazard. Give yourself a minimum of two mower widths of clearance around these hazards and hand-trim with a walk behind mower or string trimmer. Wheels dropping over retaining walls, edges, ditches, embankments, or into water can cause rollovers, which may result in serious injury, death, or drowning.

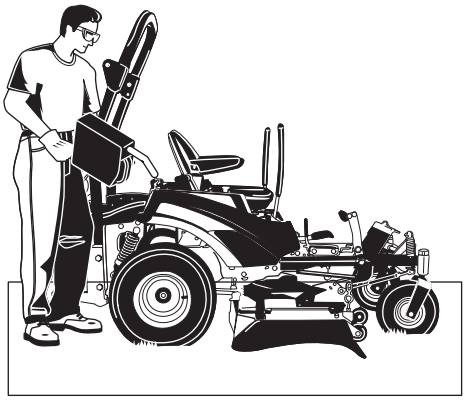


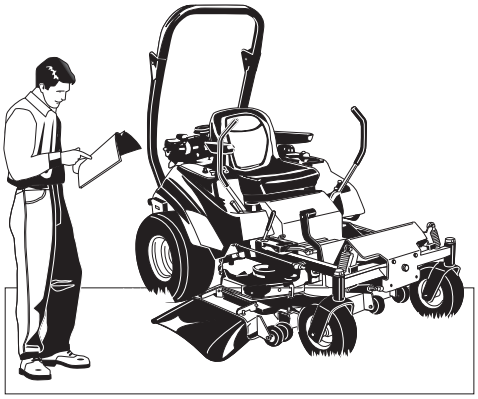
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Overhead Obstacles

Check for overhead clearances before driving under any objects. Do not allow the roll bar to contact low overhanging obstacles such as tree branches and guide wires.





Fuel and Maintenance

Always disengage all drives, shutoff the engine, and remove the key before doing any cleaning, refueling, or servicing.

Gasoline and its vapors are extremely flammable. Do not smoke while operating or refueling. Do not add fuel while engine is hot or running. Allow engine to cool for at least 3 minutes prior to adding fuel.

Do not add fuel indoors, in an enclosed trailer, garage, or any other enclosed area that is not well ventilated. Gasoline spills should be cleaned up promptly and before operation begins.

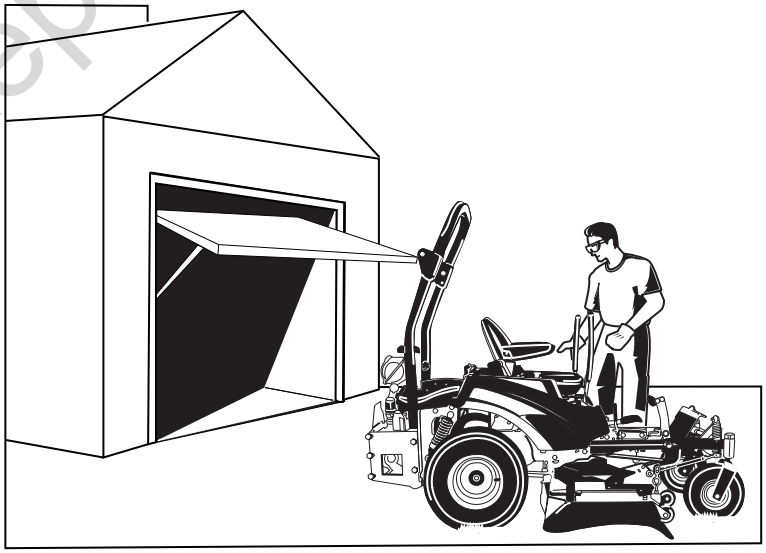
Gasoline should be stored only in sealed containers approved for fuel.

Proper maintenance is critical to the safety and performance of your unit. Keep the unit free of grass, leaves, and excess oil. Be sure to perform the maintenance procedures listed in this manual, especially periodically testing the safety system.

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Enclosed Areas

Only operate this unit outdoors and away from unventilated areas such as inside garages or enclosed trailers. The engine emits poisonous carbon monoxide gas and prolonged exposure in an enclosed area can result in serious injury or death.



Operator Safety

Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of unit, severe personal injury or death to you, or bystanders, or damage to property or equipment. **This mowing deck is capable of amputating hands and feet and throwing objects.** The triangle ⚠ in text signifies important cautions or warnings which must be followed.

TRAINING

1. Read, understand, and follow all instructions in the manual and on the unit before starting. If the operator(s) or mechanic(s) can not read English it is the owner's responsibility to explain this material to them.
2. Become familiar with the safe operation of the equipment, operator controls, and safety signs.
3. All operators and mechanics should be trained. The owner is responsible for training the users.
4. Only allow responsible adults, who are familiar with the instructions, to operate the unit.
5. Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
6. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.
7. Data indicates that operators, age 60 years and above, are involved in a large percentage of riding mower-related injuries. These operators should evaluate their ability to operate the riding mower safely enough to protect themselves and others from serious injury.

PREPARATION

1. Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Use only accessories and attachments approved by the manufacturer.
2. Wear appropriate clothing including safety shoes, safety glasses and ear protection. Long hair, loose clothing or jewelry may get tangled in moving parts.
3. Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire, which can be thrown by the machine.
4. Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 a) Use only an approved container.
 b) Never remove fuel cap or add fuel with the engine running. Allow engine to cool before refueling. Do not smoke.
 c) Never refuel or drain the machine indoors.
5. Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

OPERATION

1. Never run an engine in an enclosed area.
2. Mow only in the daylight or with good artificial light, keeping away from holes and hidden hazards.
3. Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position. Use seat belts if provided.
4. Be sure of your footing while using pedestrian controlled equipment, especially when backing up. Walk, don't run. Reduced footing could cause slipping.
5. Slow down and use extra care on hillsides. Be sure to travel in the recommended direction on hillsides. Turf conditions can affect the machines stability. Use caution when operating near drop-offs.
6. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while traveling in reverse.
7. Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the deflector in place.
8. Slow down and use caution when making turns and when changing directions on slopes.
9. Never raise deck with the blades running.
10. Never leave a running unit unattended. Always disengage the PTO, set parking brake, stop engine, and remove keys before dismounting. Keep hands and feet away from the cutting units.
11. Turn off the PTO switch to disengage the blades when not mowing.
12. Never operate with guards not securely in place. Be sure all interlocks are attached, adjusted properly and functioning properly.
13. Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
14. Do not change the engine governor setting or overspeed the engine.
15. Stop on level ground, lower implements, disengage drives, engage parking brake, shut off engine before leaving the operator's position for any reason including emptying the grass catchers or unclogging the chute.
16. Stop equipment and inspect blades after striking objects or abnormal vibration occurs. Make necessary repairs before resuming operations.
17. Keep hands and feet away from the cutting units.
18. Look behind and down before backing up to be sure of a clear path.
19. Never carry passengers and keep pets and bystanders away.
20. Do not operate the unit while under the influence of alcohol or drugs.
21. Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades if not mowing.
22. Use care when loading or unloading the machine into a trailer or truck.

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23. Use care when approaching blind corners, shrubs, trees or other objects that may obscure vision.
24. To reduce fire hazard, keep unit free of grass, leaves & excess oil. Do not stop or park over dry leaves, grass or combustible materials.

⚠ WARNING

It is a violation of California Public Resource Code, Section 4442, to use or operate the engine on any forest-covered, brush-covered or grass-covered land unless the exhaust system is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order. Other states or federal jurisdictions may have similar laws. Contact an Authorized Service Dealer to obtain a spark arrester designed for the exhaust system installed on this engine.

25. OSHA regulations may require the use of hearing protection when exposed to sound levels greater than 85 dBA for an 8 hour time period.

⚠ CAUTION



This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss though extended periods of exposure.

Wear hearing protection when operating this machine.

SLOPE OPERATION

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not drive on it.

⚠ WARNING

Do not use this machine on slopes greater than 15°.*

Select slow ground speed before driving onto slope. Use extra caution when operating on slopes with rear-mounted grass catchers.

Mow across the face of slopes, not up and down, use caution when changing directions and DO NOT START OR STOP ON SLOPE.

Do

1. Mow across slopes, not up and down.
2. Remove obstacles such as rocks, tree limbs, etc.
3. Watch for holes, ruts, or bumps. Uneven terrain could overturn the unit. Tall grass can hide obstacles.
4. Use slow speed. Choose a slow speed so that you will not have to stop or change speed while on the slope.
5. Use extra care with grass catchers or other attachments. These can change the stability of the unit.
6. Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.
7. See your authorized dealer for recommendations of available weights to improve stability.

Do Not

1. Avoid starting, stopping, or turning on a slope. If tires lose traction (i.e. machine stops forward motion on a slope), disengage the blade(s) (PTO) and drive slow off the slope.
2. Do not turn on slopes unless necessary, and then, turn slowly and gradually uphill, if possible. Never mow down slopes.
3. Do not mow near drop-offs, ditches, or embankments. The operator could lose footing or balance or mower could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
4. Do not mow on wet grass. Reduced footing or traction could cause sliding.
5. Do not try to stabilize the unit by putting your foot on the ground. (ride-on units)
6. Do not mow excessively steep slopes.
7. Do not use grass catcher on steep slopes.
8. Do not mow slopes if you cannot back up them.

TOWED EQUIPMENT (RIDE-ON UNITS)

1. Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the hitch point.
2. Follow the manufacturer's recommendations for weight limit for towed equipment and towing on slopes. See attaching a trailer under OPERATION.
3. Never allow children or others in or on towed equipment.
4. On slopes, the weight of the towed equipment may cause loss of traction and loss of control.
5. Travel slowly and allow extra distance to stop.
6. Do not shift to neutral and coast down hill.

CHILDREN

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the unit and the mowing activity. Never assume that children will remain where you last saw them.

1. Keep children out of the mowing area and under the watchful care of another responsible adult.
2. Be alert and turn unit off if children enter the area.
3. Before and during reverse operation, look behind and down for small children.
4. Never carry children, even with the blade(s) off. They may fall off and be seriously injured or interfere with safe unit operation. Children who have been given rides in the past may suddenly appear in the mowing area for another ride and be run over or backed over by the machine.
5. Never allow children to operate the unit.
6. Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

*This limit was determined per CEN Standard EN 836:1997, Section 5.2.2 and is based on the EN 836 Stability Test procedure described in Section 4.2.4.2. The 15 degree "limit of stability" is equal to 50% of the angle at which machine lift-off occurred in static tests. Actual dynamic stability may vary depending on operating conditions.

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EMISSIONS

1. Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.
2. Look for the relevant Emissions Durability Period and Air Index information on the engine emissions label.

IGNITION SYSTEM (GASOLINE MODELS)

1. This spark ignition system complies with Canadian ICES-002.

SERVICE AND MAINTENANCE

To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.

Safe Handling of Gasoline

1. Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
2. Use only approved gasoline containers.
3. Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling.
4. Never fuel the machine indoors.
5. Never store the machine or fuel container where there is an open flame, spark, or pilot light such as near a water heater or other appliance.
6. Never fill containers inside a vehicle or on a truck bed with a plastic bed liner. Always place containers on the ground away from your vehicle before filling.
7. Remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
8. Keep nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
9. If fuel is spilled on clothing, change clothing immediately.
10. Never over-fill the fuel tank. Replace gas cap and tighten securely.
11. Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.
12. If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
13. Replace all fuel tank caps and fuel container caps securely.

Maintenance and Storage

1. Always observe safe refueling and fuel handling practices when refueling the unit after transportation or storage.
2. Always follow the engine manual instructions for storage preparations before storing the unit for both short and long term periods.
3. Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.
4. Never store the machine or fuel container inside where there is an open flame, such as in a water heater. Allow unit to cool before storing.
5. Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
6. Keep all hardware, especially blade attachment bolts, tight and keep all parts in good working condition. Replace all worn or damaged decals.
7. Never tamper with safety devices. Check their proper operation regularly.
8. Disengage drives, lower implement, set parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
9. Clean grass and debris from cutting units, drives, mufflers, and engine to prevent fires. Clean up oil or fuel spillage.
10. Let engine cool before storing and do not store near flame.
11. Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.
12. Park machine on level ground. Never allow untrained personnel to service machine.
13. Use jack stands to support components when required.
14. Carefully release pressure from components with stored energy.
15. Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
16. Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace blades. Never straighten or weld them.
17. Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
18. Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothes and use insulated tools.
19. Grass catcher components are subject to wear, damage, and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
20. Check brake operation frequently. Adjust and service as required.
21. Use only factory authorized replacement parts when making repairs.
22. Always comply with factory specifications on all settings and adjustments.
23. Only authorized service locations should be utilized for major service and repair requirements.
24. Never attempt to make major repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding of manufacturer's warranty.
25. Units with hydraulic pumps, hoses, or motors: WARNING: Hydraulic fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If foreign fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result. Keep body and hands away from pin holes or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, and not hands, to search for

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leaks. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. If leaks occur, have the unit serviced immediately by your authorized dealer.

26. WARNING: Stored energy device. Improper release of springs can result in serious personal injury. Springs should be removed by an authorized technician.
27. Models equipped with an engine radiator: WARNING: Stored energy device. To prevent serious bodily injury from hot coolant or steam blow-out, never attempt to remove the radiator cap while the engine is running. Stop the engine and wait until it is cool. Even then, use extreme care when removing the cap.

ROLL BAR INSTRUCTIONS

For models equipped with factory-installed Roll Over Protection System (ROPS).

⚠ WARNING

In order to avoid serious injury or death from roll over, it is important to follow the warnings listed below.

OPERATIONAL WARNINGS

- Always use the seat belt when the roll bar is in the raised position.
- Never use the seat belt when the roll bar is in the down position.
- Remember there is no roll over protection when the roll bar is in the down position so it is very important to always keep the roll bar in the raised position whenever possible.
- Lower the roll bar to the down position only when it is absolutely necessary.
- Check for overhead clearances before driving under any objects. Do not allow roll bar to contact low overhanging obstacles such as tree branches and guide wires.
- Never remove the roll bar from the vehicle.
- Do not exceed the machine weight rating of the roll bar.
- Read and follow all of the instructions shown below regarding the inspection and maintenance of the roll bar structure and the seat belt.

INSPECTION OF THE ROLL BAR PROTECTIVE STRUCTURE

⚠ WARNING

Failure to properly inspect and maintain the ROLL BAR protective structure can cause serious injury or death.

A ROLL BAR, like any other safety device, needs to be periodically inspected to verify that the integrity of the device has not been compromised through normal machine use, misuse, age degradation, modifications, or a roll over.

To maintain operator roll over protection and roll bar effectiveness:

- If a ROLL BAR becomes damaged for any reason, such as a collision, roll over or impact, the ROLL BAR must be replaced. Small undetectable cracks can reduce the effectiveness of the ROLL BAR. Never weld, straighten, or repair the ROLL BAR.
- Never alter the ROLL BAR by welding anything to it or by drilling additional holes.
- **BEFORE FIRST TIME USE** - Inspect the ROLL BAR structure and mounting hardware for:

 1) Check to make sure the machine GVW (Gross Vehicle Weight), including attachments, restrained payload, fuel and operator, is not in excess of the maximum weight specified on the ROLL BAR label.
 2) Make sure there isn't any missing, damaged, or loose mounting hardware.
 3) Make sure the ROLL BAR has been correctly and completely installed.

- **EVERY 100 HOURS** - Inspect the ROLL BAR structure and mounting hardware for:

 1) Any cracks in the structure (structural members and/or welds).
 2) Significant corrosion on any part of the ROLL BAR structure or hardware.
 3) Missing, damaged, or loose mounting hardware
 4) Mounting hardware that is of a grade lesser than specified.
 5) Machine GVW (Gross Vehicle Weight), including attachments, restrained payload, fuel and operator, in excess of the maximum weight specified on the ROLL BAR label.
 6) Any modifications that have been made, such as unauthorized welds and holes.
 7) Any permanent deformation or twisting of the ROLL BAR structure.
 8) That the ROLL BAR label is still in place and is readable.
 9) That the ROLL BAR on-product warning labels are still on the ROLL BAR and are readable.

- If there is any doubt as to the condition of the ROLL BAR, remove the machine from service and contact your dealer for assistance.

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⚠ WARNING

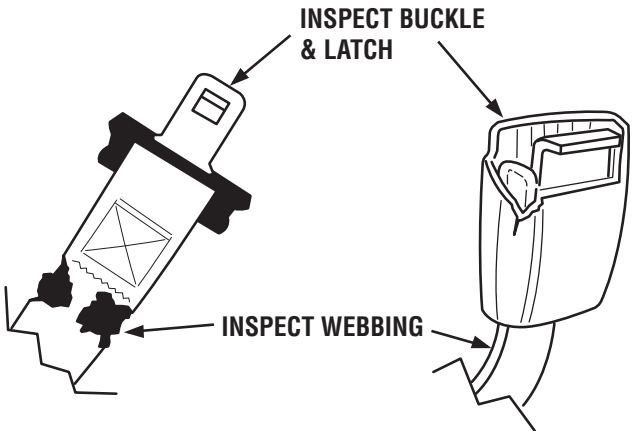
Failure to properly inspect and maintain the seat belt can cause serious injury or death.

INSPECTION AND MAINTENANCE OF THE ROLL BAR SEAT BELT

- The seat belt like the ROLL BAR, needs to be periodically inspected to verify that the integrity has not been compromised through normal machine use, misuse, age degradation, modifications, or a roll over. If the seat belt does not pass all of the following tests, it should be replaced.

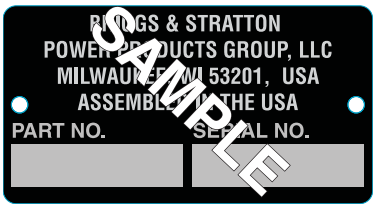
- **BEFORE EACH USE** – Conduct the following inspections/maintenance of the seat belt and retraction mechanism:

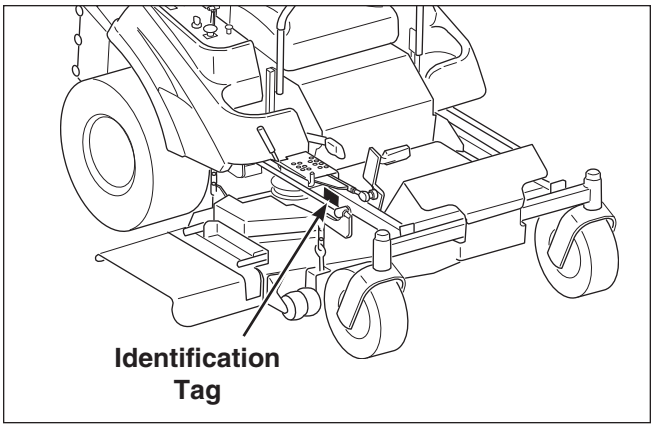
 1) Check for dirt or debris in the retraction mechanism. If dirt or debris is found, it should be removed.
 2) Check to make sure the retraction mechanism retracts easily and completely.
 3) Check for damage to any part of the seat belt such as nicks, cuts, loose stitching, or fraying.
 4) Check that the buckle and latch operate properly and that the latch plate is not excessively worn, deformed, or the buckle is damaged or cracked. The seat belt should latch and release easily.



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Identification Numbers





When contacting your authorized dealer for replacement parts, service, or information you MUST have these numbers.

Record your part number, serial number and engine serial numbers in the space provided for easy access. These numbers can be found in the locations shown.

NOTE: For location of engine identification numbers, refer to the engine owner's manual.

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SAFETY DECALS

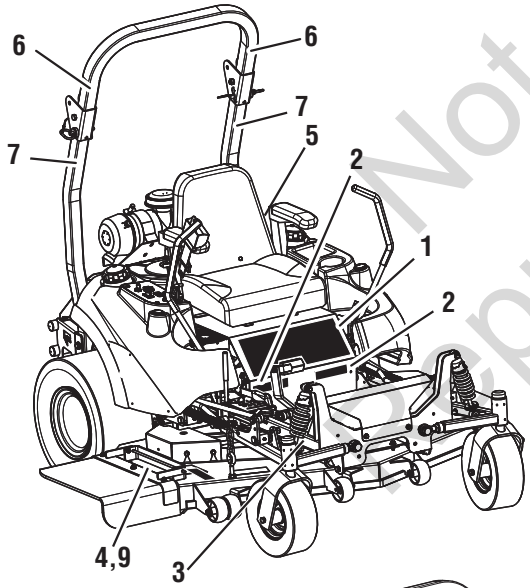
This unit has been designed and manufactured to provide you with the safety and reliability you would expect from an industry leader in outdoor power equipment manufacturing.

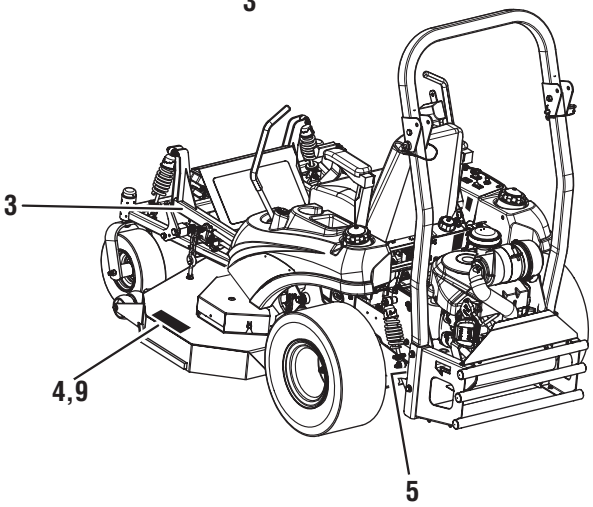
Although reading this manual and the safety instructions it contains will provide you with the necessary basic knowledge to operate this equipment safely and effectively, we have placed several safety labels on the unit to remind you of this important information while you are operating your unit.

All DANGER, WARNING, CAUTION and instructional messages on your rider and mower should be carefully read and obeyed. Personal bodily injury can result when these instructions are not followed. The information is for your safety and it is important! The safety decals below are on your rider and mower.

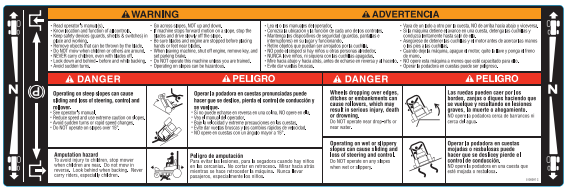
If any of these decals are lost or damaged, replace them at once. See your local dealer for replacements.

These labels are easily applied and will act as a constant visual reminder to you, and others who may use the equipment, to follow the safety instructions necessary for safe, effective operation.





1



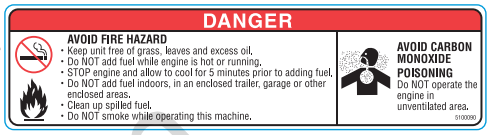
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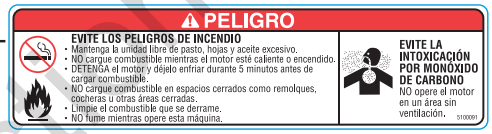
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11



12

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SAFETY INTERLOCK SYSTEM

This unit is equipped with safety interlock switches. These safety systems are present for your safety, do not attempt to bypass safety switches, and never tamper with safety devices. Check their operation regularly.

Operational SAFETY Checks

Test 1 — Engine should NOT crank if:

- PTO switch is engaged, OR
- Parking brake is not engaged, OR
- Ground speed control levers are not in the NEUTRAL position.

Test 2 — Engine SHOULD crank if:

- PTO switch is NOT engaged, AND
- Parking brake is engaged, AND
- Ground speed control levers are locked in the NEUTRAL position.

Test 3 — Engine should SHUT OFF if:

- Operator rises off seat with PTO engaged, OR
- Operator rises off seat with parking brake disengaged.
- Operator moves ground speed control levers out of their neutral positions before disengaging parking brake.

Test 4 — Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within seven (7) seconds after electric PTO switch is turned off (or operator rises off seat). If mower drive belt does not stop within seven (7) seconds, see your dealer.

NOTE: Once the engine has stopped, PTO switch must be turned off, parking brake must be engaged, and the motion control handles must be locked in the NEUTRAL position after the operator returns to the seat in order to start the engine.

⚠ WARNING

If the unit does not pass a safety test, do not operate it. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety interlock system.

SAFETY ICONS

The alert symbol ⚠ is used to identity safety information about hazards that can result in personal injury. A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of the injury. In addition, a hazard icon may be used to represent the type of hazard. An explanation of hazard levels and icons are as follows:

⚠ DANGER

This indicates a hazard which, if not avoided, **will result in serious injury or death.**

⚠ WARNING

This indicates a hazard which, if not avoided, **could result in serious injury or death.**

⚠ CAUTION

This indicates a hazard which, if not avoided, **might result in minor or moderate or death.**

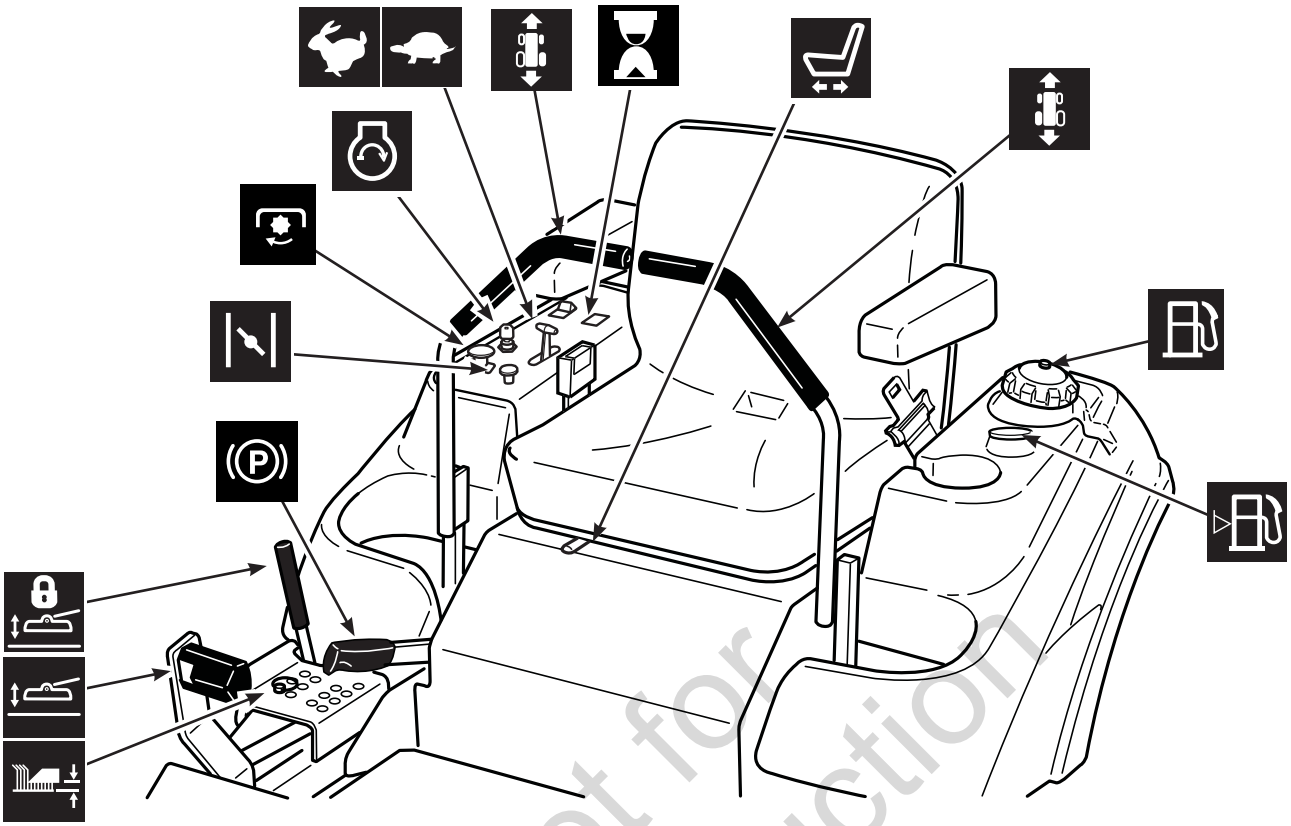
NOTICE

These messages presented without the alert symbol indicate a situation where the unit or property could be damaged.

NORTH AMERICAN SAFETY ICONS



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CONTROL FUNCTIONS

The information below briefly describes the function of individual controls. Starting, stopping, driving, and mowing require the combined use of several controls applied in specific sequences. To learn what combination and sequence of controls to use for various tasks see the OPERATION section.

Ground Speed Control Levers

These levers control the ground speed of the rider. The left lever controls the left rear drive wheel and the right lever controls the right rear drive wheel.

Moving a lever forward increases the FORWARD speed of the associated wheel, and pulling back on a lever increases the REVERSE speed.

Note: The further a lever is moved away from the neutral position the faster the drive wheel will turn.

See the Operating the Zero Turn Rider section for steering instructions.

Seat Adjustment Lever

The seat can be adjusted forward and back. Move the lever towards the left, position the seat as desired, and release the lever to lock the seat in position.

Ignition Switch

The ignition switch starts and stops the engine, it has three positions:

O	OFF	Stops the engine and shuts off the electrical system.
I	RUN	Allows the engine to run and powers the electrical system.
	START	Cranks the engine for starting.

NOTE: Never leave the ignition switch in the RUN position with the engine stopped–this drains the battery.

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Parking Brake

DISENGAGE Releases the parking brake.

ENGAGE Locks the parking brake.

Pull the parking brake lever back to engage the parking brake. Move the lever fully forward to disengage the parking brake. *NOTE: To start the unit the parking brake must be engaged.*

PTO (Power Take Off) Switch

The PTO switch engages and disengages the mower. Pull UP on the switch to engage, and push DOWN to disengage.

Deck Lift Pedal, Cutting Height Adjustment Pin & Deck Lift Lock Lever

These control the cutting height of the mower deck. Depress the pedal until it locks into the 5” (12,7 cm) position. Place the adjustment pin in the desired cutting height and release the lift lock lever.

Throttle Control

The throttle controls engine speed. Move the throttle forward to increase engine speed and back to decrease engine speed. Always operate at FULL throttle.

Choke

Close the choke for cold starting. Open the choke once the engine starts. A warm engine may not require choking. Pull the knob UP to close the choke. Push to knob DOWN to open the choke.

Hour Meter

The hour meter measures the number of hours the PTO has been engaged. The hour meter has a self contained power source so the total hours are always visible.

Fuel Tank Cap

To remove the cap, turn counterclockwise.

Fuel Level Gauge

Displays the fuel level in the tank.

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GENERAL OPERATING SAFETY

Before first time operation:

- Be sure to read all information in the Safety and Operation sections before attempting to operate this tractor and mower.
- Become familiar with all of the controls and how to stop the unit.
- Drive in an open area without mowing to become accustomed to the unit.

⚠ WARNING

Never operate on slopes greater than 15° which is a rise of 5.4 feet (1,6 m) vertically in 20 feet (6 m) horizontally.

Select slow ground speed before driving onto a slope. Use extra caution when operating on slopes with a rear-mounted grass catcher.

Mow across the face of slopes, not up and down, use caution when changing directions and
DO NOT START OR STOP ON SLOPE.

⚠ WARNING

Never allow passengers to ride on the unit.

Before leaving the operator's position for any reason, engage the parking brake, disengage the PTO, stop the engine and remove the key.

To reduce fire hazard, keep the engine, tractor and mower free of grass, leaves and excess grease. Do not stop or park tractor over dry leaves, grass or combustible materials.

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

CHECKS BEFORE STARTING

- Check that crankcase is filled to full mark on dipstick (C, Figure 1). See the engine Operator's Manual for instructions and oil recommendations.
- Make sure all nuts, bolts, screws and pins are in place and tight.
- Adjust the seat position, and make certain you can reach all controls from operator's position.
- Fill the fuel tank with fresh fuel. Refer to engine manual for fuel recommendations.

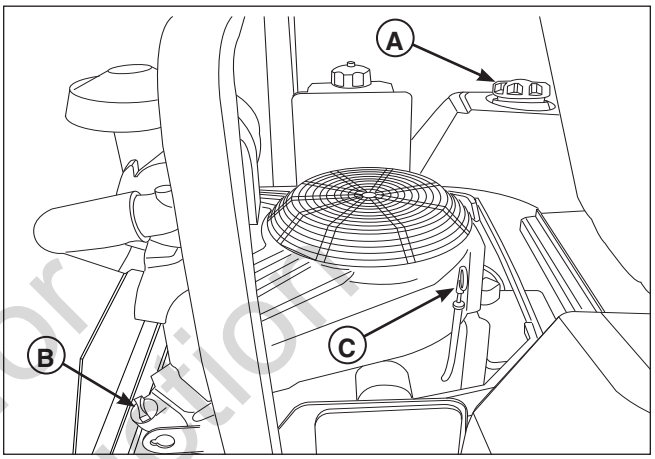


Figure 1. Pre-start Checks (Briggs & Stratton Vanguard model shown)
A. Fuel Tank Cap
B. Crankcase Oil Fill
C. Oil Dipstick

⚠ WARNING

Do not load this zero-turn rider on a trailer or truck using two separate ramps. Only use a single ramp that is at least one foot wider than the width of the rear wheels of this rider. This rider has a zero turning radius and the rear wheels could fall off the ramps, or the rider could tip over injuring the operator or bystanders.



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⚠ WARNING

If you do not understand how a specific control functions, or have not yet thoroughly read the FEATURES & CONTROLS section, do so now.

Do NOT attempt to operate the tractor without first becoming familiar with the location and function of ALL controls.

STARTING THE ENGINE

1. While sitting in the operator's seat, engage the parking brake and make sure the PTO switch is disengaged and the ground speed control levers are locked in the NEUTRAL position.
2. ***NOTE: A warm engine may not require choking.***

 Set the engine throttle control to FAST throttle position. Then fully close the choke by pulling the knob OUT fully.
3. Insert the key into the ignition switch and turn it to START.
4. After the engine starts, gradually open the choke (push knob down fully). Reduce to half throttle speed and allow engine to warm up.

Warm up the engine by running it for at least a minute before engaging the PTO switch or driving the rider.

5. **After warming the engine, ALWAYS operate the unit at FULL THROTTLE when mowing.**

In the event of an emergency the engine can be stopped by simply turning the ignition switch to STOP. *Use this method only in emergency situations. For normal engine shut down follow the procedure given in STOPPING THE RIDER.*

STOPPING THE RIDER

1. Returning the ground speed control levers to the middle position will stop rider movement. Pivot the levers outward and lock them in NEUTRAL.
2. Disengage the PTO by pushing down on the PTO switch.
3. Engage the parking brake by pulling the handle up until it locks into position.
4. Move the throttle control to mid-throttle position and turn the ignition key to OFF. Remove the key.

PUSHING THE RIDER BY HAND

DO NOT TOW RIDER
Towing the unit will cause hydraulic pump and wheel motor damage. Do not use another vehicle to push or pull this unit.

1. Disengage the PTO, engage the parking brake, turn the ignition OFF, and remove the key.
2. Lift the seat plate to gain access to the hydraulic pumps.
3. To disengage the pumps (free-wheel position), turn the hydraulic release valves (A, Figure 2) located on the pumps COUNTER-CLOCKWISE a maximum of 2 full turns.
4. Disengage the parking brake.

 The tractor can now be pushed by hand.
5. After moving the tractor, re-engage the pumps (drive position) by turning the release valves CLOCKWISE and tighten to 80-120 in. lbs. of torque.

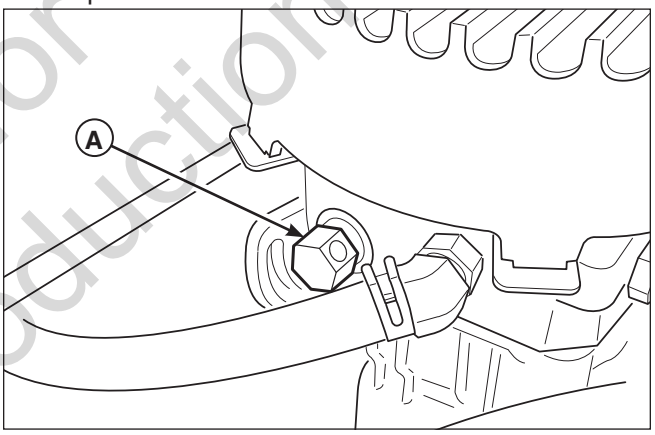


Figure 2. Hydraulic System By-Pass
A. Hydraulic Release Valve (left-hand pump shown)

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ZERO TURN DRIVING PRACTICE

The lever controls of the Zero Turn rider are responsive, and learning to gain a smooth and efficient control of the rider's forward, reverse, and turning movements will take some practice.

Spending some time going through the maneuvers shown and becoming familiar with how the unit accelerates, travels, and steers — before you begin mowing —is absolutely essential to getting the most out of the Zero Turn rider.

Locate a smooth, flat area of your lawn — one with plenty of room to maneuver. (Clear the area of objects, people and animals before you begin.) Operate the unit at mid-throttle during this practice session (ALWAYS operate at full throttle when mowing), and turn slowly to prevent tire slippage and damage to your lawn.

We suggest you begin with the Smooth Travel procedure to the right, and then advance through the forward, reverse, and turning maneuvers.

You must release the parking brake prior to moving the control levers inward.

Smooth Travel

The lever controls of the Zero Turn rider are responsive.

The BEST method of handling the ground speed control levers is in three steps — as shown in Figure 3.

FIRST place your hands onto the levers as shown.

SECOND, to go forward gradually push the levers forward with your palms.

THIRD, to speed up move the levers farther forward. To slow down smoothly, slowly move the levers toward neutral.

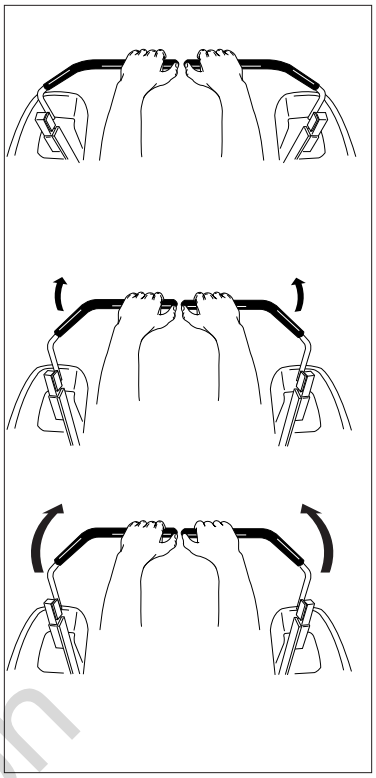


Figure 3. Move Control Levers Gradually

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BASIC DRIVING

Forward Travel Practice

Gradually move both ground speed control levers — evenly FORWARD from neutral. Slow down and repeat.

NOTE: Straight forward travel takes practice. If necessary, top speed can be balance-adjusted — see the Speed Balancing Adjustment in the Adjustments section near the back of this manual.

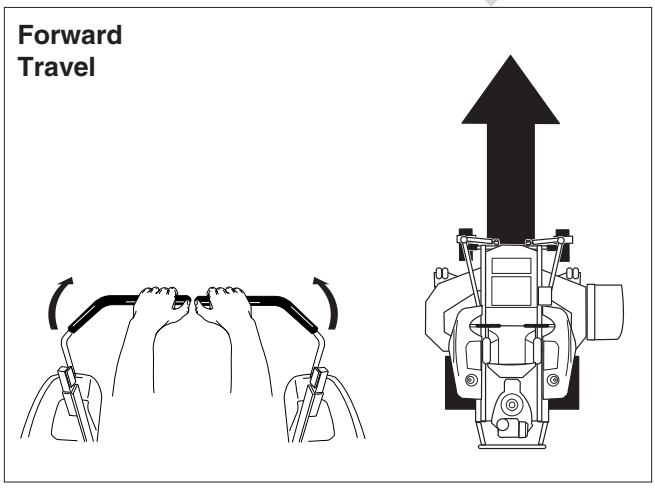


Figure 4. Forward Travel

Reverse Travel Practice

LOOK DOWN & BEHIND, then gradually move both ground speed control levers evenly BACK from neutral. Slow down and repeat.

NOTE: Practice backing up for several minutes before attempting to do so near objects. The rider turns sharply in reverse as well as forward, and backing up straight takes practice.

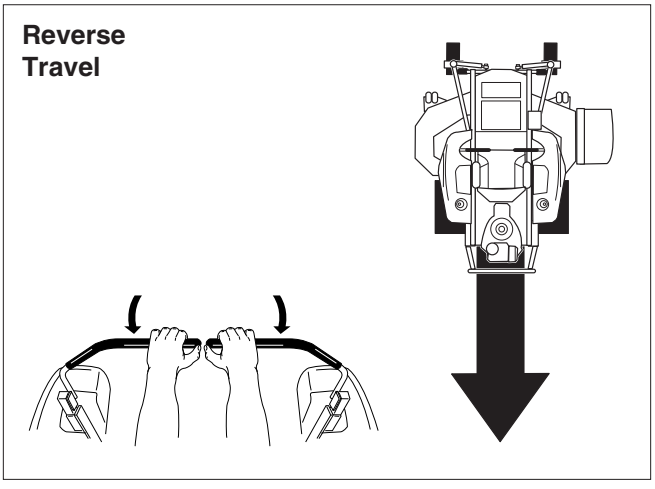


Figure 5. Reverse Travel

Practice Turning Around a Corner

While traveling forward allow one handle to gradually return back toward neutral. Repeat several times.

NOTE: To prevent pivoting directly on the tire tread, it is best to keep both wheels going at least slightly forward.

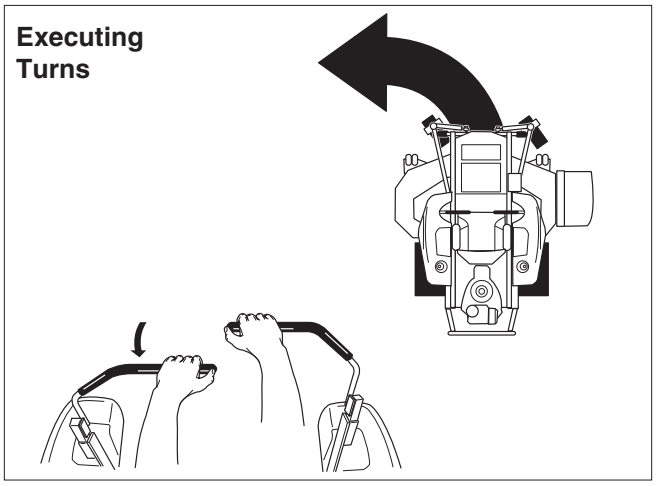


Figure 6. Turning Around a Corner

Practice Turning In Place

To turn in place, "Zero Turn," gradually move one ground speed control lever forward from neutral and one lever back from neutral simultaneously. Repeat several times.

NOTE: Changing the amount each lever is pulled—forward or back, changes the "pivot point" you turn on.

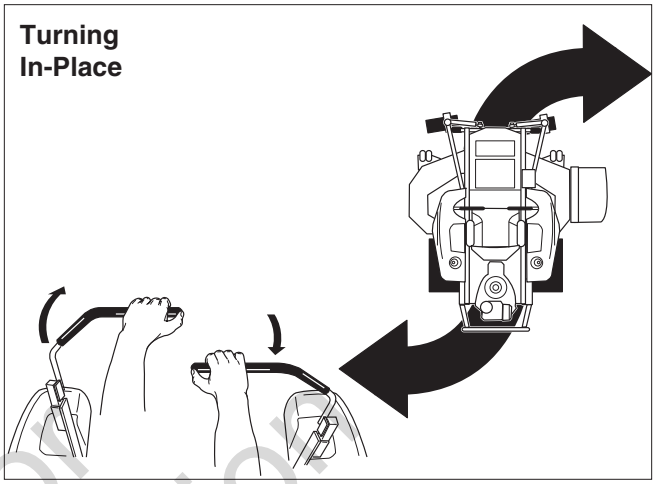


Figure 7. Turning in Place

ADVANCED DRIVING

Executing an End-Of-Row Zero Turn

Your Zero Turn Rider's unique ability to turn in place allows you to turn around at the end of a cutting row rather than having to stop and Y-turn before starting a new row.

For example, to execute a left end-of row zero turn:

1. Slow down at the end of the row.
2. Move the RIGHT ground speed control lever forward slightly while moving the LEFT ground speed control lever back to center and then slightly back from center.
3. Begin mowing forward again.

This technique turns the rider LEFT and slightly overlaps the row just cut—eliminating the need to back up and re-cut missed grass.

As you become more familiar and experienced with operating the Zero Turn rider, you will learn more maneuvers that will make your mowing time easier and more enjoyable.

Remember, the more you practice, the better your control of the Zero Turn will be!

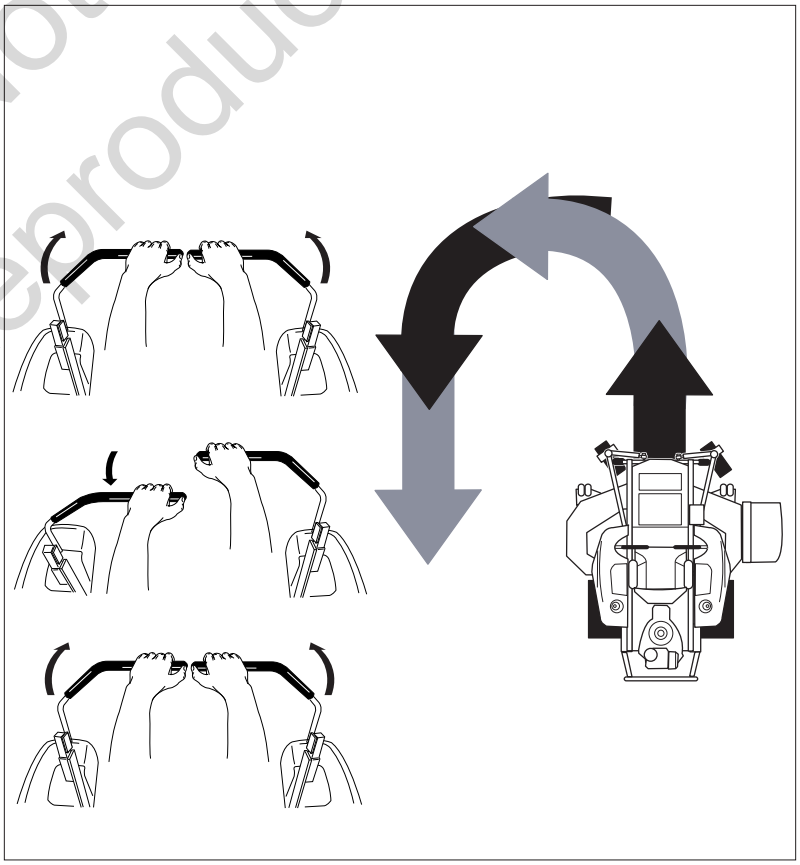


Figure 8. Executing an End-Of-Row Turn

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MOWING

1. Engage the parking brake. Make sure the PTO switch is disengaged, the ground speed control levers are locked in the NEUTRAL position and the operator is on the seat.
2. Start the engine (see STARTING THE ENGINE).
3. Set the mower cutting height.
4. Set the throttle to FULL.
5. Engage the PTO by pulling up on the PTO switch.
6. Begin mowing.
7. When finished, shut off the PTO.
8. Stop the engine (see STOPPING THE TRACTOR AND ENGINE).

MOWING RECOMMENDATIONS

Several factors can affect how well your machine cuts grass, Following proper mowing recommendations can improve the performance and life of your machine.

Height of Grass

Often cutting height is a matter of personal preference. Typically, you should mow the grass when it is is between three and five inches high. The proper cutting height range for a specific lawn will depend upon several factors, including the type of grass, the amount of rainfall, the prevailing temperature, and the lawn's overall condition.

Cutting the grass too short causes weak, thin grass plants, which are easily damaged by dry periods and pests. Cutting too short is often more damaging than allowing the grass to be slightly higher.

Letting grass grow a bit longer—especially when it is hot and dry—reduces heat build-up, preserves needed moisture and protects the grass from heat damage and other problems. However, allowing grass to grow too high can cause thin turf and additional problems.

Cutting off too much at one time shocks the plant's growth system and weakens the grass plants. **A good rule of thumb is the 1/3 rule: to cut no more than one third of the grass height, and never more than 1 inch at a time.**

The amount of grass you are able to cut in one pass is also effected by the type of mowing system you are using (for example, broadcasting with side discharge decks can process a much larger volume of grass than mulching does).

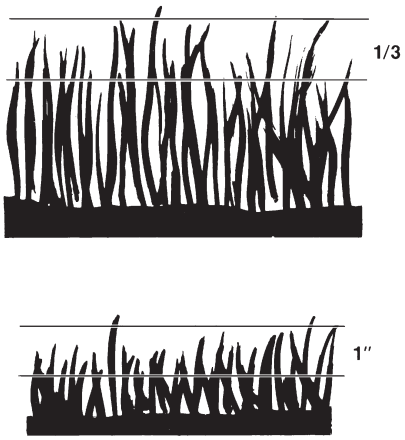


Figure 9. Proper Cutting Height

Tall Grass Requires Incremental Cutting

For extremely tall grass, set the cutting height at maximum for the first pass, and then reset it to the desired height and mow a second or third time.

Don't cover the grass surface with a heavy layer of clippings. Consider using a grass collection system and starting a compost pile.

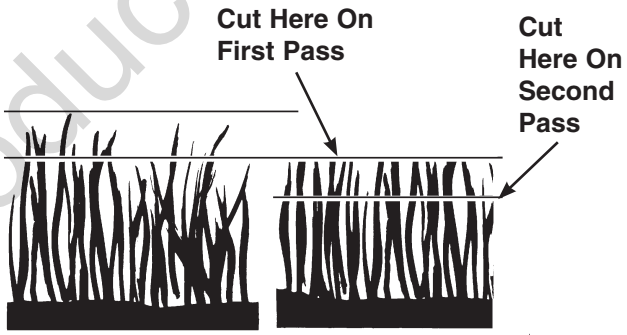


Figure 10. Incremental Cutting

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When and How Often to Mow

The time of day and condition of the grass greatly affect the results you'll get when mowing. For the best results, follow these guidelines:

1. Mow when the grass is between three and five inches high.
2. Mow with sharp blades. Short clippings of grass one inch or shorter decompose more quickly than longer blades. Sharp mower blades cut grass cleanly and efficiently, preventing frayed edges which harm the grass.
3. Mow at time of day when the grass is cool and dry. Late afternoon or early evening often provide these ideal mowing conditions.
4. Avoid mowing after rain or even heavy dew, and never mulch when the grass is wet (moist grass does not mulch well, and clumps beneath the mower deck).

Mowing Patterns

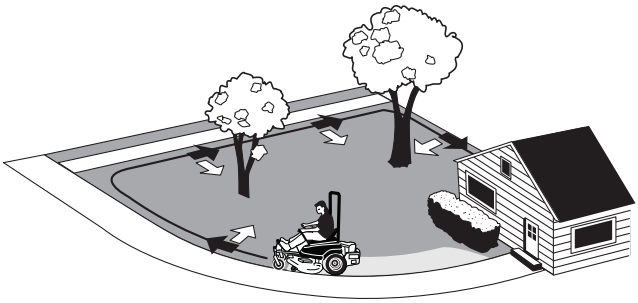
Always start mowing on a smooth, level area.

The size and type of area to be mowed will determine the best mowing pattern to use. Obstructions such as trees, fences and buildings, and conditions such as slopes and grades must also be considered.

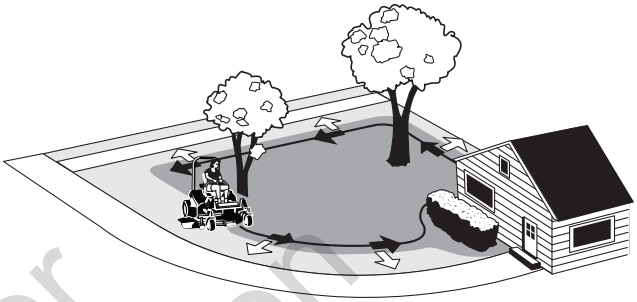
1. Cut long straight strips overlapping slightly.
2. Where possible, change patterns occasionally to eliminate matting, graining or a corrugated appearance.
3. For a truly professional cut, mow across the lawn in one direction, then recut the lawn by mowing perpendicular to the previous cut.

Note: Always operate the engine at full throttle when mowing.

If you hear the engine slowing down, you are mowing too fast—using a slower ground speed will improve the cutting efficiency of the blades and prevents many common cutting problems. Use an appropriate ground speed for the thickness and height of the grass you are cutting (3rd gear or slower for manual gear models). If you hear the engine slowing down you are mowing too fast, use a slower ground speed.



Where possible, make one or two passes around the outside of the area discharging the grass INTO the lawn to keep the cut grass off fences and walks.



The remainder of the mowing should be done in the opposite direction so that the clippings are dispersed OUT onto the area of lawn previously cut.

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MOWING METHODS

Proper Broadcast Mowing

Broadcasting, or side-discharging, disperses fine clippings evenly over the entire lawn. Many golf courses use this method. Your mower has a deep dish deck to allow freer circulation of clippings so they are broadcast evenly over the lawn.

ENGINE SPEED & GROUND SPEED FOR BROADCASTING

Always operate the engine at full throttle when mowing. If you hear the engine slowing down, you are mowing too fast—using a slower ground speed will improve the cutting efficiency of the blades and prevents many common cutting problems.

ALWAYS use an appropriate ground speed for the thickness and height of the grass you are cutting (3rd gear or slower for manual gear models). If you hear the engine slowing down you are mowing too fast, use a slower ground speed.

HOW MUCH GRASS TO CUT OFF WHEN BROADCASTING

Mow when the grass is 3-5 inches long. Do not cut the grass shorter than 2 to 2-1/2 inches. Do not cut off more that 1 inch of grass in a single pass

Proper Mulching

Mulching consists of a mower deck which cuts and recuts clippings into tiny particles and which then blows them down INTO the lawn. These tiny particles decompose rapidly into by-products your lawn can use. UNDER PROPER CONDITIONS, your mulching mower will virtually eliminate noticeable clippings on the lawn surface.

NOTE: When mulching under heavy cutting conditions, a rumbling sound may be present and is normal.

MULCHING REQUIRES EXCELLENT MOWING CONDITIONS

Mulching mowers cannot function properly if the grass is wet, or if the grass is simply to high to cut. Even more than normal mowing, mulching requires that the grass be dry and the the appropriate amount is cut.

Do not use the mower as a mulching mower during the first two or three mowings in the spring. The long grass blades, quick growth, and often wetter conditions are more suitable for broadcasting (side-discharging) or grass bagging operation.

ENGINE SPEED & GROUND SPEED FOR BROADCASTING

Use full engine throttle matched with a slow ground speed so that clippings will be finely cut. Ground speed while mulching should be HALF of the speed that would be used when broadcasting (side discharging) under similar conditions. Since mulching requires more horsepower than broadcasting, using a slower ground speed is vitally important for proper mulching operation.

HOW MUCH GRASS TO MULCH

The best mulching action typically results from cutting only the top 1/2 inch to 3/4 inch of grass blade. This provides short clippings which decompose properly (much more quickly than longer clippings). The ideal cutting height will vary with climate, time of year, and quality of your lawn. We recommend that you experiment with both the cutting height and ground speed until you achieve the best cut. Start with a high cutting height and using progressively lower settings until you find a cutting height that is matched to your mowing conditions and preferences.

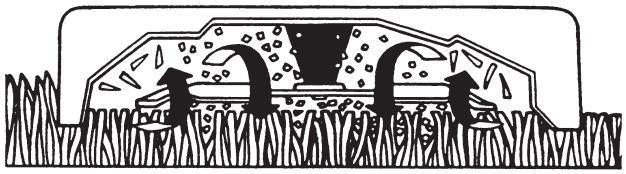


Figure 11. Mulching Action

ATTACHING A TRAILER

The maximum weight of a towed trailer should be less than 200 lbs (91kg). Secure the trailer with a appropriately sized clevis pin (A, Figure 12) and clip (B).

Excessive towed loads can cause loss of traction and loss of control on slopes. Reduce towed weight when operating on slopes. The surface being driven on greatly impacts traction and stability. Wet or slippery surfaces can greatly reduce traction and the ability to stop or turn. Carefully evaluate the surface conditions before operating the unit and trailer, and never operate on slopes greater than 10°. See SLOPE OPERATION and TOWED EQUIPMENT in the safety section of this manual for additional safety information.

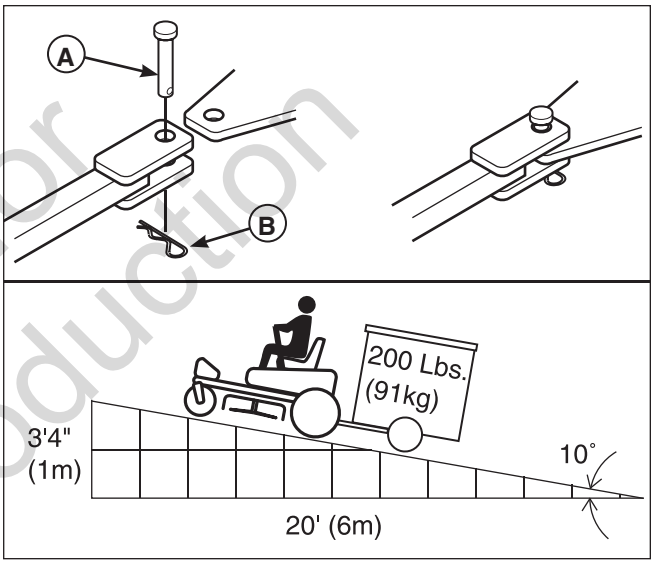


Figure 12. Trailer Weight Recommendations
A. Clevis Pin
B. Clip

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RAISE & LOWER THE ROLL BAR

To lower the roll bar:

1. Pull the hair pin clips (A, Figure 13) out of the retainer pins (B).
2. Push or pull the top of the roll bar (C) forward against the rubber stops (D) and remove the retainer pins (B).
3. Lower the roll bar and reinstall the retainer pins and hair pin clips to secure the roll bar in the down position (see insert, Figure 13).

To raise the roll bar:

1. Pull the hair pin clips (A) out of the retainer pins (B) and remove the retainer pins.
2. Raise the roll bar (C) until the rubber stops (D) contact the upright tubes.
3. Push or pull the top of the roll bar forward against the rubber stops and reinstall the retainer pins and hair pin clips to secure the roll bar in the raised position.

⚠ WARNING

AVOID SERIOUS INJURY OR DEATH FROM ROLL OVER:

Keep roll bar in the raised position and use seat belt.

THERE IS NO ROLL OVER PROTECTION WHEN THE ROLL BAR IS DOWN

Lower the roll bar only when necessary and NEVER remove it.

Do NOT use seat belt when the roll bar is down.

Raise the roll bar as soon as clearance permits.

Do NOT jump off if mower tips.

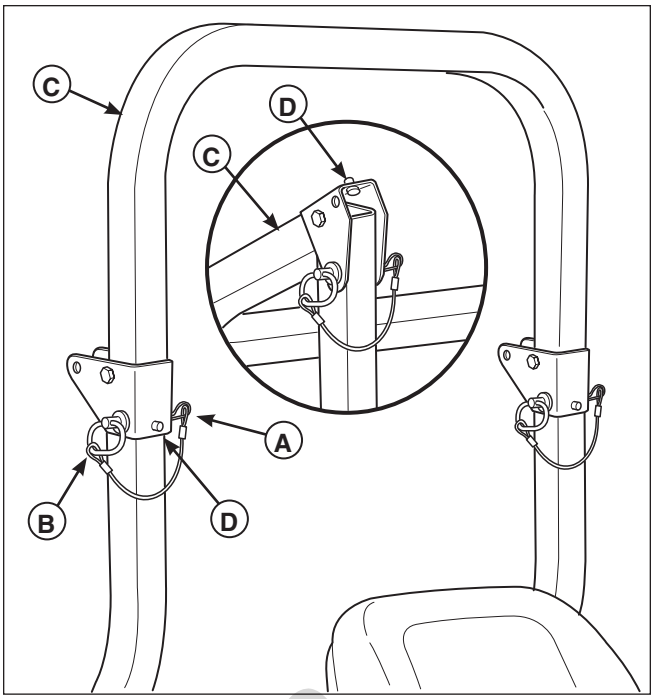


Figure 13. Raise & Lower the Roll Bar
A. Hair Pin Clip
B. Retainer Pin
C. Roll Bar
D. Rubber Stop

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STORAGE

Temporary Storage (30 Days Or Less)

Remember, the fuel tank will still contain some gasoline, so never store the unit indoors or in any other area where fuel vapor could travel to any ignition source. Fuel vapor is also toxic if inhaled, so never store the unit in any structure used for human or animal habitation.

Here is a checklist of things to do when storing your unit temporarily or in between uses:

- Keep the unit in an area away from where children may come into contact with it. If there's any chance of unauthorized use, remove the spark plug (s) and put in a safe place. Be sure the spark plug opening is protected from foreign objects with a suitable cover.
- If the unit can't be stored on a reasonable level surface, chock the wheels.
- Clean all grass and dirt from the mower.

Long Term Storage (Longer Than 30 Days)

Before you store your unit for the off-season, read the Maintenance and Storage instructions in the Safety Rules section, then perform the following steps:

1. Drain crankcase oil while engine is hot and refill with a grade of oil that will be required when unit is used again.
2. Prepare the mower deck for storage as follows:
 a. Remove mower deck from the unit.
 b. Clean underside of mower deck.
 c. Coat all bare metal surfaces with paint or light coat of oil to prevent rusting.
3. Clean external surfaces and engine.
4. Prepare engine for storage. See engine owner's manual.
5. Clean any dirt or grass from cylinder head cooling fins, engine housing and air cleaner element.
6. Cover air cleaner and exhaust outlet tightly with plastic or other waterproof material to keep out moisture, dirt and insects.
7. Completely grease and oil unit as outlined in the Normal Care section.
8. Clean up unit and apply paint or rust preventative to any areas where paint is chipped or damaged.
9. Be sure the battery is filled to the proper level with water and is fully charged. Battery life will be increased if it is removed, put in a cool, dry place and fully charged about once a month. If battery is left in unit, disconnect the negative cable.

⚠ WARNING

Never store the unit, with gasoline in engine or fuel tank, in a heated shelter or in enclosed, poorly ventilated enclosures. Gasoline fumes may reach an open flame, spark or pilot light (such as a furnace, water heater, clothes dryer, etc.) and cause an explosion.

Handle gasoline carefully. It is highly flammable and careless use could result in serious fire damage to your person or property.

Drain fuel into an approved container outdoors away from open flame or sparks.

10. Drain fuel system completely or add a gasoline stabilizer to the fuel system. If you have chosen to use a fuel stabilizer and have not drained the fuel system, follow all safety instructions and storage precautions in this manual to prevent the possibility of fire from the ignition of gasoline fumes. Remember, gasoline fumes can travel to distant sources of ignition and ignite, causing risk of explosion and fire.

NOTE: Gasoline, if permitted to stand unused for extended periods (30 days or more), may develop gummy deposits which can adversely affect the engine carburetor and cause engine malfunction. To avoid this condition, add a gasoline stabilizer to the fuel tank and run the engine a few minutes, or drain all fuel from the unit before placing it in storage.

STARTING AFTER LONG TERM STORAGE

Before starting the unit after it has been stored for a long period of time, perform the following steps.

1. Remove any blocks from under the unit.
2. Install the battery if it was removed.
3. Unplug the exhaust outlet and air cleaner.
4. Fill the fuel tank with fresh gasoline. See engine manual for recommendations.
5. See engine owner's manual and follow all instructions for preparing engine after storage.
6. Check crankcase oil level and add proper oil if necessary. If any condensation has developed during storage, drain crankcase oil and refill.
7. Inflate tires to proper pressure. Check fluid levels.
8. Start the engine and let it run slowly. DO NOT run at high speed immediately after starting. Be sure to run engine only outdoors or in well ventilated area.

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MAINTENANCE SCHEDULE

The following schedule should be followed for normal care of your rider and mower. You will need to keep a record of your operating time. Determining operating time is easily accomplished by observing the elapsed time recorded by the hour meter.

MOWER MAINTENANCE
Before Each Use
Check Safety Interlock System
Check Rider Brakes
Check for loose hardware
Check Hydraulic Oil Level
Every 25 Hours
Clean Deck & Check / Replace Mower Blades*
Lubricate Rider & Mower*
Check Tire Pressure
Every 100 Hours
Clean Battery & Cables
Every 250 Hours
Change Hydraulic Oil & Filter

* More often in hot (over 85° F: 30° C) weather or dusty operating conditions.

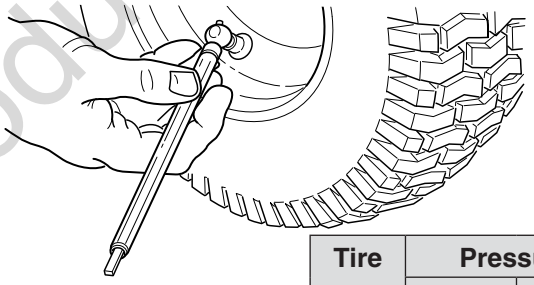
ENGINE MAINTENANCE
Before Each Use
Check Engine Oil Level
Every 25 Hours
Check / Clean Cooling Fins & Intake*
Every 50 Hours
Check / Clean Spark Arrester**
Refer to Engine Owner's Manual
Service Air Filter
Check / Replace Spark Plugs
Check / Replace Fuel Filter
Check / Clean Spark Arrester

* More often in hot (over 85° F: 30° C) weather or dusty operating conditions.

** If equipped. Replace if damaged.

CHECK TIRE PRESSURES

Tire pressure should be checked periodically, and maintained at the levels shown in the chart. Note that these pressures may differ slightly from the "Max Inflation" stamped on the side-wall of the tires. The pressures shown provide proper traction, improve cut quality, and extend tire life.



Tire	Pressure	
	psi	bar
Front	25	1,72
Rear	15	1,03

Figure 14. Checking Tire Pressure

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CHECKING / ADDING FUEL

To add fuel:

1. Remove the fuel cap (see Figure 1).
2. Fill the tank to the bottom of the filler neck. This will allow for fuel expansion.

NOTE: Do not overfill. Refer to your engine manual for specific fuel recommendations.

3. Install and hand tighten the fuel cap.

FUEL FILTER

The fuel filter is located in the fuel line between fuel tank and carburetor, near the fuel pump. If filter is dirty or clogged, replace as follows:

1. Disconnect the negative battery cable.
2. Place a container below the filter to catch spilled fuel.
3. Using a pliers, open and slide hose clamps from fuel filter.
4. Remove hoses from filter.
5. Install new filter in proper flow direction in fuel line.
6. Secure with hose clamps.
7. Reconnect the negative battery cable when finished.

CHANGE OIL & FILTER

1. Warm engine by running for a few minutes. (Refer to the engine operator's manual for oil & filter replacement instructions.)
2. Remove the oil drain hose (A, Figure 15) from the cable clamp (B) on the right-hand side of the frame and route the hose through hole in the engine deck as shown in Figure 15.
3. Place a small pan under the oil drain hose to catch the oil. Using the appropriate tools, remove the cap from the oil drain hose (A) and drain the engine oil.
4. After draining, replace the cap and wipe up any spilled oil. Reinstall the oil drain hose into the cable clamp to retain the hose during normal operation.
5. Place an absorbent shop cloth under the engine oil filter. Remove the engine oil filter and replace with a new one.
6. Remove the shop cloth and wipe up any spilled oil.

⚠ WARNING

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

Do not remove fuel filter when engine is hot, as spilled gasoline may ignite. DO NOT spread hose clamps further than necessary. Ensure clamps grip hoses firmly over filter after installation.

Do not use gasoline containing METHANOL, gasohol containing more than 10% ethanol, gasoline additives, premium gasoline, or white gas because engine/fuel system damage could result.

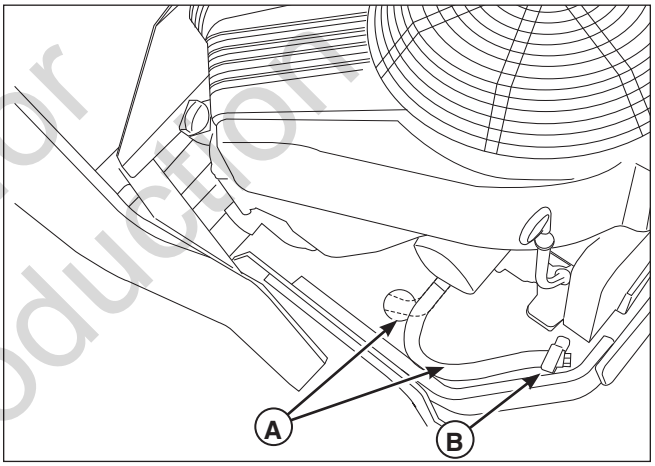


Figure 15. Engine Oil Drain (Briggs & Stratton Vanguard Model Shown)
A. Oil Drain Hose
B. Cable Clamp

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INSPECT MUFFLER AND SPARK ARRESTER

Inspect the muffler for cracks, corrosion, or other damage. Remove the spark arrester, if equipped, and inspect for damage or carbon blockage. If replacement parts required, make sure to use only original equipment replacement parts.

⚠ WARNING

Replacement parts must be the same and installed in the same position as the original parts or fire could result.

CHECK HYDRAULIC OIL LEVEL

1. Before removing the reservoir cap, make sure the area around the reservoir cap and fill neck of the reservoir is free of dust, dirt, or other debris.
2. Unscrew the reservoir cap (B, Figure 16).
3. Look down the filler neck of the hydraulic oil reservoir (A, Figure 16) and observe the oil level. When cold, the oil level should be approximately 4" (10 cm) below top of the filler neck.
4. If necessary, add either Mobil 1™, 15W-50 synthetic oil or Castrol Syntec™ 5W-50 oil. DO NOT use conventional oils.
5. Reinstall the reservoir cap.

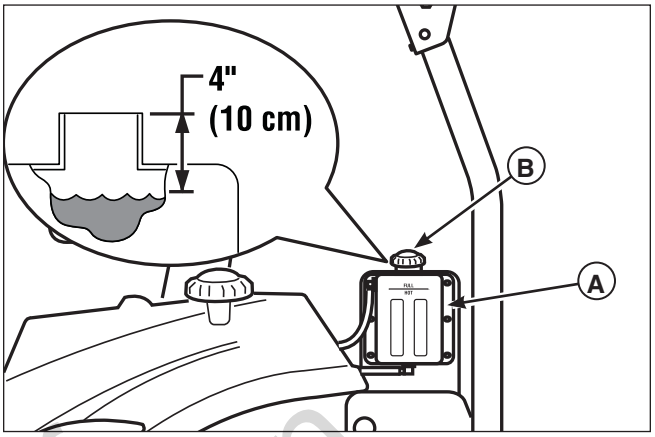


Figure 16. Checking Hydraulic Oil Level
A. Hydraulic Oil Reservoir
B. Reservoir Cap

CHANGE HYDRAULIC OIL FILTER

Change Interval: Every 250 Hours

Filter Part Number: 1719168

NOTE: Removing the oil filter from the filter base will drain the oil reservoir. Have a suitable container ready to catch any spilled oil. Ferris recommends this be a dealer-only service item.

1. Locate the transmission oil filter (A, Figure 17).
2. Lubricate the new filter base with a few drops of transmission oil. Fill the filter half full of oil.
3. Clean the area around the filter base and remove the filter. Do NOT drain the hydraulic system oil.
4. Thread the new filter onto the filter base until the gasket makes contact, then tighten 3/4 of a turn more.
5. Run the unit for several minutes and check the transmission oil level.

IMPORTANT NOTE: Use caution after changing the filter; air in the hydraulic system may affect the responsiveness of the control levers. Repeat step 5 until the air is out of the system.

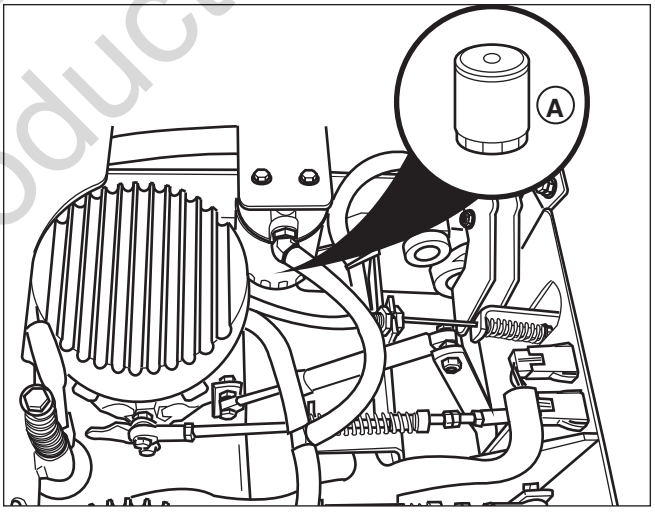


Figure 17. Change Hydraulic Oil Filter
A. Hydraulic Oil Filter

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LUBRICATION

Lubricate the unit at the locations shown in Figures 18 through 22 as well as the following lubrication points.

Grease:



- front caster wheel axles & yokes
- deck lift pivot blocks
- mower deck spindles
- mower deck idler arm

Use grease fittings when present. Disassemble parts to apply grease to moving parts when grease fittings are not installed.
Not all greases are compatible. Ferris Red Grease (p/n 5022285) is recommended, automotive-type high-temperature, lithium grease may be used when this is not available.

Oil:



- control handle pivots
- seat plate pivots
- deck lift pivots
- discharge chute hinge

Generally, all moving metal parts should be oiled where contact is made with other parts. Keep oil and grease off belts and pulleys. Remember to wipe fittings and surfaces clean both before and after lubrication.

Lubricating the Front Casters:

NOTE: Front casters should be lubricated annually.

1. Remove the 1/4-28 bolt (A, Figure 22) screwed into the front caster and install a 1/4-28 grease fitting.
2. Grease the front caster.
3. Remove the 1/4-28 grease fitting and reinstall the 1/4-28 bolt.
4. Repeat process for the other side of the machine.

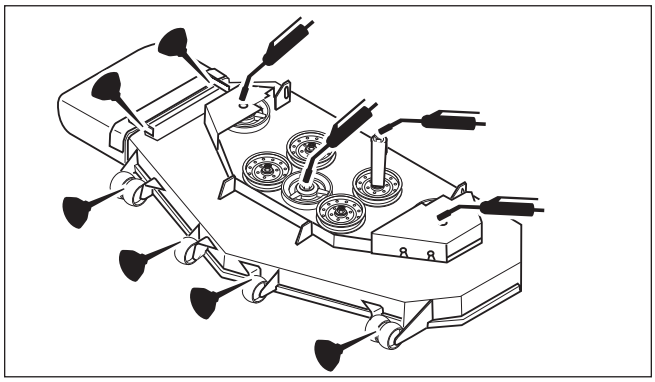


Figure 18. Deck Lubrication

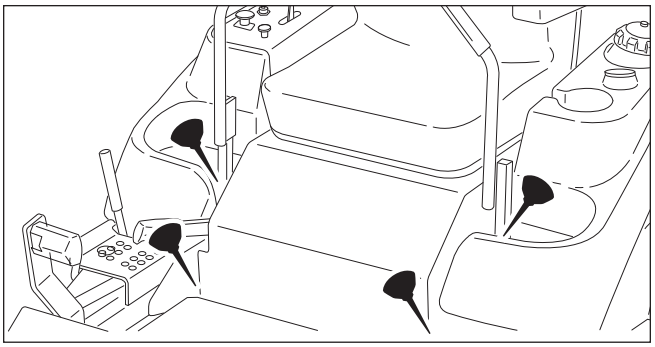


Figure 19. Control Handle Pivots & Seat Plate Pivots

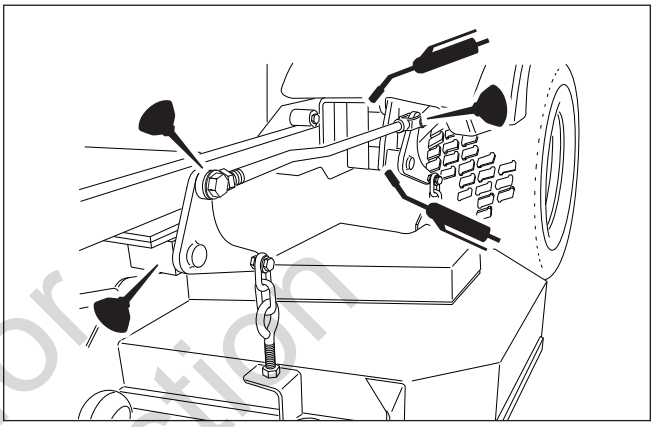


Figure 20. Deck Lift Linkage Pivots

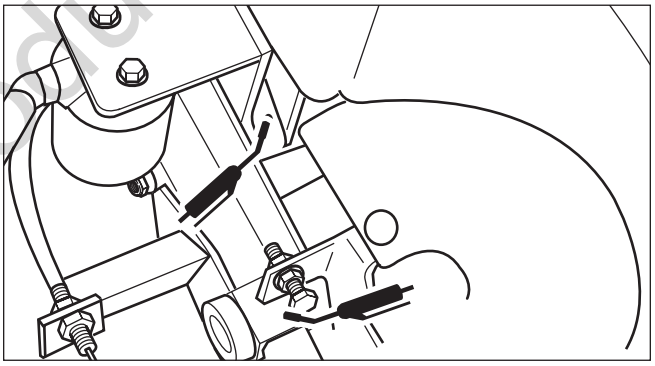


Figure 21. Suspension & Deck Lift Pivots

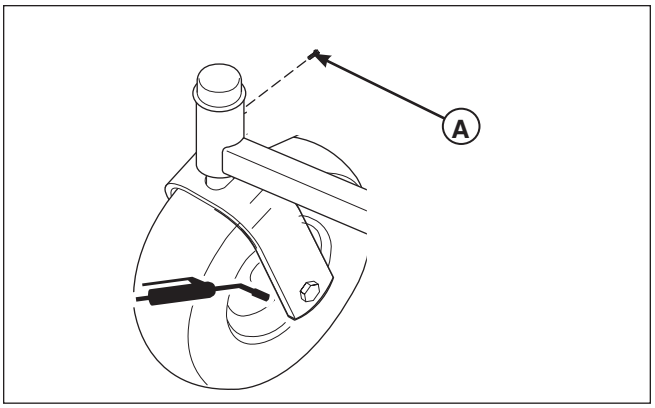


Figure 22. Front Caster & Wheel
A. 1/4-28 Bolt

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BATTERY MAINTENANCE

NOTE: This unit is equipped with a maintenance-free BCIU1 battery.

Cleaning the Battery and Cables

1. Disconnect the cables from the battery, negative (black) cable first (B, Figure 23).
2. Clean the battery terminals and cable ends with a wire brush until shiny.
3. Reinstall the battery and reattach the battery cables, positive (red) cable first (A).
4. Coat the cable ends and battery terminals with petroleum jelly or non-conducting grease.

⚠ WARNING

Be careful when handling the battery. Avoid spilling electrolyte. Keep flames and sparks away from the battery.

When removing or installing battery cables, disconnect the negative cable FIRST and reconnect it LAST. If not done in this order, the positive terminal can be shorted to the frame by a tool.

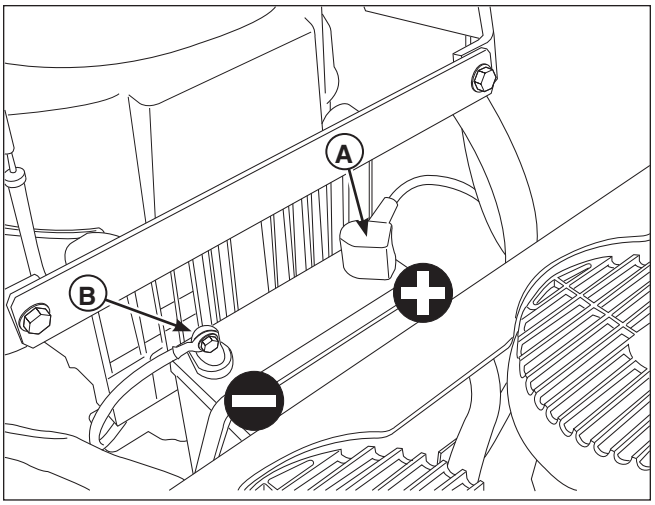


Figure 23. Battery Compartment
A. Positive (+) Cable & Terminal
B. Negative (-) Cable & Terminal

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SERVICING THE MOWER BLADES

Removing the Mower Blade

⚠ CAUTION

Avoid injury. Mower blades are sharp.

• Always wear gloves when handling mower blades or working near blades.

1. To remove the mower blade, wedge a wooden block between the mower blade and the mower deck housing to keep the blade from turning and remove the mower blade mounting bolt with a 15/16" wrench (Figure 24).

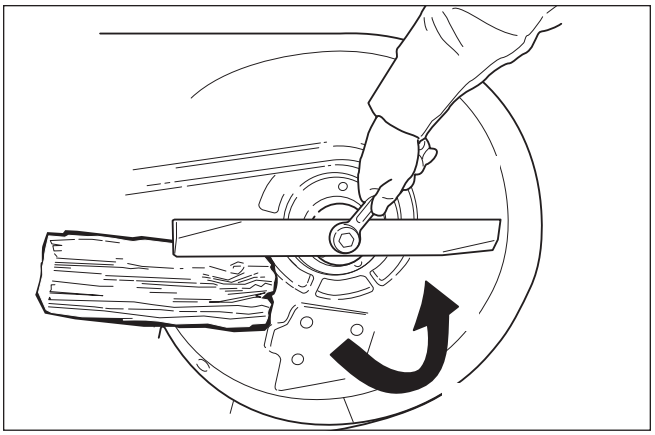


Figure 24. Loosening the Mower Blade for Removal

Inspecting the Mower Blade

⚠ DANGER

Avoid injury. A worn or damaged blade can break, and a piece of the mower blade could be thrown into the operator's or bystander's area, resulting in serious personal injury or death.

• Inspect the mower blade every 25 hours or at least once a year.

• If the mower blade hits a solid object, stop the engine immediately and inspect the mower blade.

• Never weld or straighten bent mower blades.

1. Remove the mower blade from the unit.
2. Inspect the mower blade (Figures 25 & 26). Discard the mower blade if it has any of the below conditions:

 A.) Has more than .5" (12,7 mm) of the mower blade metal removed from previous sharpening or wear (D, Figure 25).

 B.) The air lifts are excessively eroded (B & C, Figure 26) and the notch (C) is .25" (6,35 mm) deep or greater.

 C.) Mower blade is bent or broken.
3. If the cutting edges are not sharp or have nicks, sharpen the blades. See SHARPENING THE MOWER BLADES.

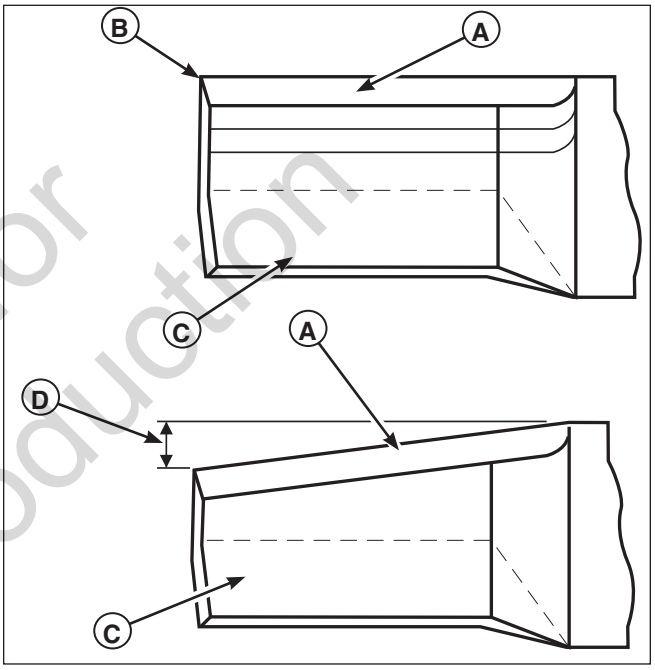


Figure 25. Inspecting the Mower Blade Tips
A. Mower Blade Cutting Edge
B. Square Corner
C. Air Lift
D. Wear Measurement - DISCARD Mower Blade If greater than .5" (12,7 mm)

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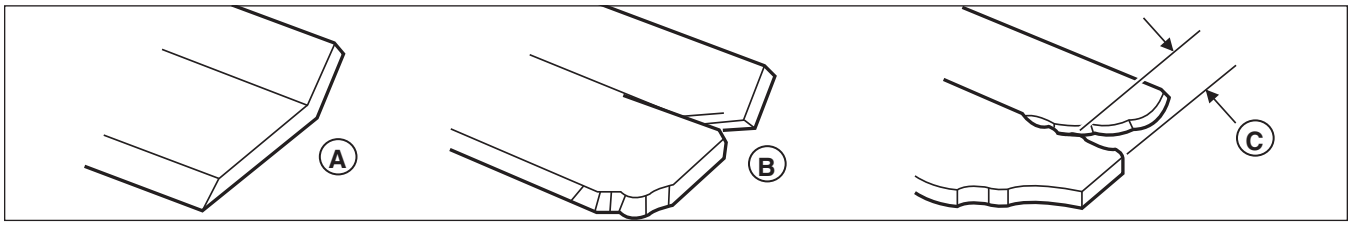


Figure 25. Inspecting the Mower Blade Air Lifts
A. New Mower Blade
B. Mower Blade at Wear Limit (A notch begins to form)
C. Mower Blade in Dangerous Condition (Notch measures .25" (6,35 mm) or greater DO NOT USE. Replace with new mower blade.)

Sharpening the Mower Blades

⚠ CAUTION

Avoid injury. Mower blades are sharp.

• Always wear gloves when handling mower blades or working near blades.

• Always wear safety eye protection when grinding

1. Sharpen the mower blade with a grinder, hand file, or electric blade sharpening.
2. Sharpen the mower blade by removing an equal amount of material from each end of the mower blade.
3. Keep the original bevel (A, Figure 26) when grinding. Do NOT change the mower blade bevel.
4. The mower blade should have a maximum 1/64" (0,40 mm) cutting edge (B) or less.
5. Balance the mower blade before installing.

Balancing the Mower Blades

⚠ CAUTION

Avoid injury. Keep mower blades balanced.

• An unbalanced mower blade can create excessive vibration and damage the unit or cause mower blade failure.

1. Clean the mower blade to remove any dried grass or other debris.
2. See Figure 27. Put the mower blade on a nail in a vise and turn the blade to the horizontal position.
3. Check the balance of the mower blade. If either end of the mower blade moves downward, sharpen the heavy end until the mower blade is balanced. See SHARPENING THE MOWER BLADES for proper sharpening instructions.
4. Repeat the process until the mower blade remains in the horizontal position.

Reinstalling the Mower Blades

1. Reinstall each mower blade with the air lifts pointing up towards the mower deck as shown in Figure 28. Secure with the mower blade mounting bolt and flat washer (A & B, Figure 28).
2. Wedge a wooden block between the mower blade and the mower deck housing to keep the mower blade from turning and torque to 70 ft. lbs (94 Nm).

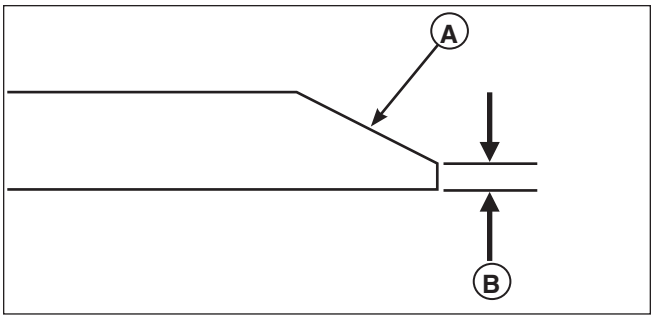


Figure 26. Sharpening the Mower Blade
A. Mower Blade Bevel
B. Mower Blade Cutting Edge

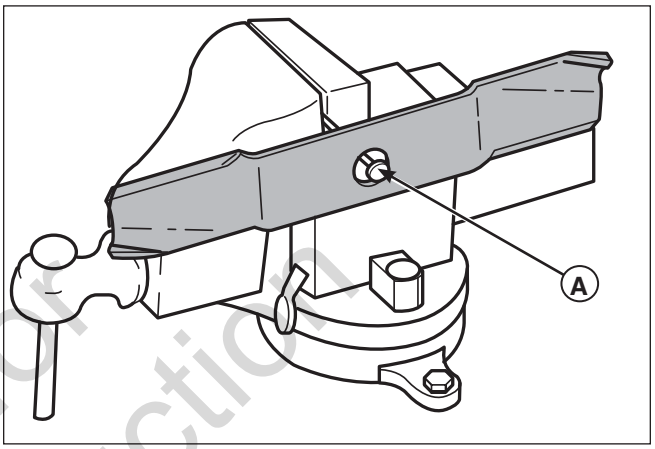


Figure 27. Balancing the Mower Blade
A. Nail

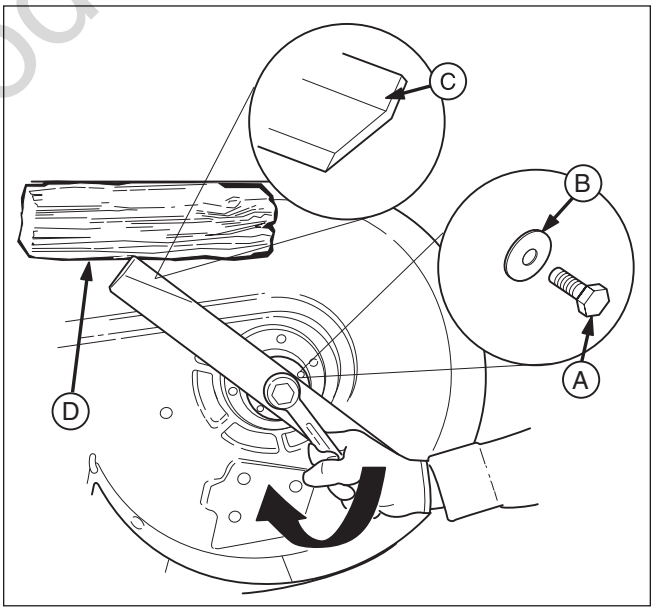


Figure 28. Tightening the Mower Blade for Installation
A. Mower Blade Mounting Bolt
B. Flat Washer
C. Mower Blade Air Lift (Points Up For Installation)
D. 4 X 4 Wooden Block

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TROUBLESHOOTING

While normal care and regular maintenance will extend the life of your equipment, prolonged or constant use may eventually require that service be performed to allow it to continue operating properly.

The troubleshooting guide below lists the most common problems, their causes and remedies.

See the information on the following pages for instructions on how to perform most of these minor adjustments and service repairs yourself. If you prefer, all of these procedures can be performed for you by your local authorized dealer.

⚠ WARNING

To avoid serious injury, perform maintenance on the tractor or mower only when the engine is stopped and the parking brake engaged.

Always remove the ignition key, disconnect the spark plug wire and fasten it away from the plug before beginning the maintenance, to prevent accidental starting of the engine.

Troubleshooting the Rider

PROBLEM	CAUSE	REMEDY
Engine will not turnover or start.	Parking brake not engaged.	Engage parking brake.
	PTO (electric clutch) switch in ON position.	Place if OFF position.
	Out of fuel.	If engine is hot, allow it to cool, the refill the fuel tank.
	Engine flooded.	Move choke control to closed position.
	Fuse blown.	Replace fuse.
	Battery terminals require cleaning.	Clean the battery terminals.
	Battery discharged or dead.	Recharge or replace.
	Wiring loose or broken.	Visually check wiring & replace broken or frayed wires. Tighten loose connections.
	Solenoid or starter motor faulty.	See authorized dealer.
	Safety interlock switch faulty.	See authorized dealer.
	Spark plug(s) faulty, fouled or incorrectly gapped.	Clean and gap or replace. See engine manual.
	Water in fuel.	Drain and replace with fresh fuel.
	Gas is old or stale.	Drain and replace with fresh fuel.
Engine starts hard or runs poorly	Fuel mixture is too rich	Clean air filter. Check choke adjustment.
	Spark plug(s) faulty, fouled or incorrectly gapped.	Clean and gap or replace. See engine manual.
Engine knocks	Low oil level.	Check/Add oil as required.
	Using wrong grade oil.	See engine manual.
Excessive oil consumption	Engine running too hot.	Clean engine fins, blower screen and air cleaner.
	Using wrong weight oil.	See engine manual.
	Too much oil in crankcase.	Drain excess oil.
Engine exhaust is black	Dirty air filter.	Replace air filter. See engine manual.
	Engine choke control is in closed position.	Open choke control

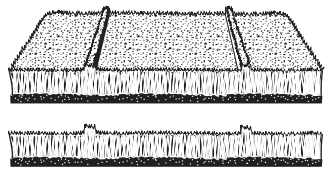
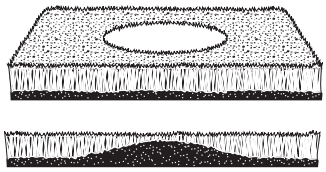
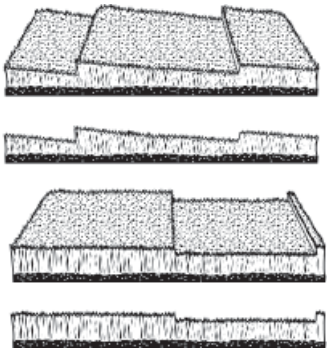
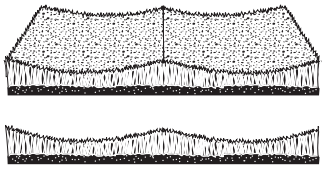
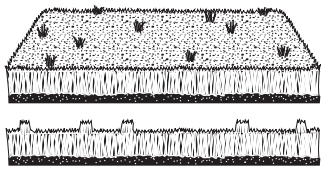
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Rider Troubleshooting Continued.		
PROBLEM	**CAUSE**	**REMEDY**
Engine runs but rider will not drive.	Hydraulic release valve(s) in "open" position.	Turn valve(s) clockwise to close.
	Belt is broken.	See Drive Belt Replacement
	Drive belt slips.	See problem and cause below.
	Brake is not fully engaged.	See authorized dealer.
Rider drive belt slips.	Pulleys or belt greasy or oily.	Clean as required.
	Tension too loose.	Adjust spring tension. See Drive Belt Replacement.
	Belt stretched or worn.	Replace belt.
Brake will not hold.	Brake is incorrectly adjusted.	See Brake Adjustment
	Brake pads worn.	Replace with new brake pads.
Rider steers or handles poorly.	Steering linkage is loose.	Check and tighten any loose connections.
	Improper tire inflation.	See Regular Maintenance Section.

Troubleshooting the Mower		
PROBLEM	**CAUSE**	**REMEDY**
Mower will not raise.	Lift linkage not properly attached or damaged.	See authorized dealer.
Engine stalls easily with mower engaged.	Engine speed too slow.	Set to full throttle.
	Ground speed too fast.	Decrease ground speed.
	Cutting height set too low.	Cut tall grass at maximum cutting height during first pass.
	Discharge chute jamming with cut grass.	Cut grass with discharge pointing towards previously cut area.
Excessive mower vibration.	Blade mounting bolts are loose.	Tighten to 70 ft. lbs. (94 Nm)
	Mower blades, arbors, or pulleys are bent.	Check and replace as necessary.
	Mower blades are out of balance.	Remove, sharpen and balance blade. See Maintenance section.
	Belt installed incorrectly.	Reinstall correctly.
Excessive belt wear or breakage	Bent or rough pulleys.	Repair or replace.
	Using incorrect belt.	Replace with correct belt.
Mower drive belt slips or fails to drive.	Idler pulley spring broken or not properly attached.	Repair or replace as needed.
	Mower drive belt broken.	Replace drive belt.
Mower does not engage.	Electrical wiring damage.	Locate & repair damaged wire.
	Battery voltage too low.	Recharge battery and check alternator. See Battery Maintenance section.

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TROUBLESHOOTING COMMON CUTTING PROBLEMS

PROBLEM	CAUSE	REMEDY
Streaking		
	1. Blades are not sharp. 2. Blades are worn down too far. 3. Engine speed is too slow. 4. Ground speed is too fast. 5. Deck is plugged with grass. 6. Not overlapping cutting rows enough. 7. Not overlapping enough when turning.	1. Sharpen your blades. 2. Replace your blades. 3. Always mow at FULL throttle. 4. Slow down. 5. Clean out the mower. 6. Overlap you cutting rows. 7. When turning your effective cutting width decreases—overlap more when turning.
Scalping		
	1. Lawn is uneven or bumpy. 2. Mower deck cutting height is set too low. 3. Ground speed is too fast. 4. Deck is not levelled correctly. 5. Tire pressure is low or uneven.	1. Roll or level the lawn. 2. Raise the cutting height. 3. Slow down. 4. Correctly level the deck. 5. Check and inflate the tires.
Stepped Cutting.		
	1. Deck is not leveled correctly. 2. Tires are not properly inflated. 3. Blades are damaged. 4. Deck shell is damaged. 5. Mower spindle is bent or loose. 6. Blades are installed incorrectly.	1. Level the deck correctly. 2. Check and inflate the tires. 3. Replace the blades. 4. Repair or replace the deck. 5. Repair or replace the spindle. 6. Reinstall the blades correctly.
Uneven Cutting		
	1. Deck is not leveled correctly. 2. Blades are dull or worn. 3. Blades are damaged. 4. Deck is clogged with grass clippings. 5. Deck shell is damaged. 6. Mower spindle is bent or loose. 7. Blades are installed incorrectly. 8. Tires are not properly inflated.	1. Level the deck correctly. 2. Sharpen or replace the blades. 3. Replace the blades. 4. Clean out the deck. 5. Repair or replace the deck. 6. Repair or replace the spindle. 7. Reinstall the blades correctly. 8. Check and inflate the tires.
Stingers		
	1. Blades are not sharp or nicked. 2. Blades are worn down too far. 3. Engine speed is too low. 4. Ground speed is too fast. 5. Deck is plugged with grass.	1. Sharpen your blades. 2. Replace your blades. 3. Always mow at full throttle. 4. Slow down. 5. Clean out the mower.

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SEAT ADJUSTMENT

See Figure 30. The seat can be adjusted forward and back. Move the lever forward, position the seat as desired, and release the lever to lock the seat into position.

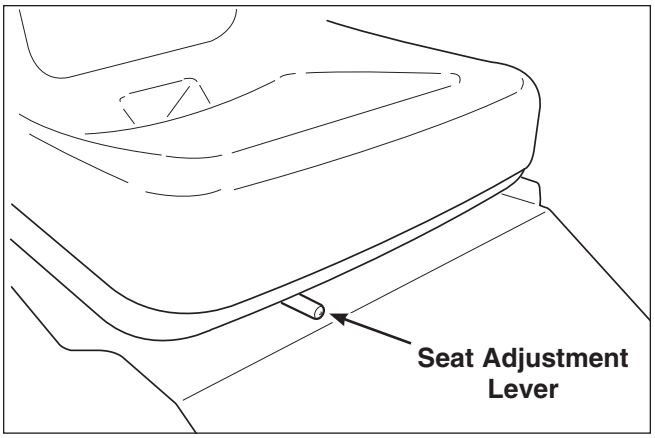


Figure 30. Seat Adjustment

GROUND SPEED CONTROL LEVER ADJUSTMENT

The control levers can be adjusted in three ways. The alignment of the control levers, the placement of the levers (how close the ends are to one another) and the height of the levers can be adjusted.

To Adjust the Handle Alignment

Loosen the mount bolts (A, Figure 31) and pivot the lever(s) (C) to align with each other.

To Adjust the Handle Placement

Loosen the jam nuts and adjust the placement bolt (B, Figure 31) in or out to properly adjust the lever end spacing.

To Adjust the Handle Height

Remove the mounting hardware and reposition the handle either up or down from its original position. You will need to readjust the handle alignment as described above.

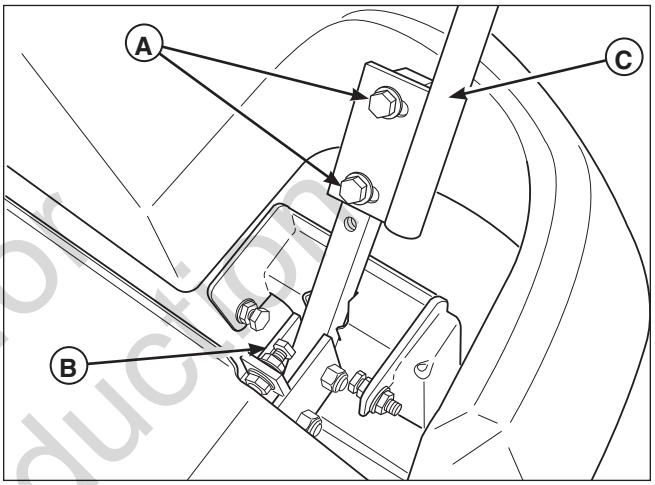


Figure 31. Control Lever Adjustment
A. Alignment Hardware
B. Placement Hardware
C. Ground Speed Control Lever

SPEED BALANCING ADJUSTMENT

If the rider veers to the right or left when the ground speed control levers are in the maximum forward position, the top speed of each of these levers can be balanced by turning the adjustment bolt(s) (A, Figure 32). Only adjust the speed of the wheel that is traveling faster.

To Reduce the Speed of the Faster Wheel

1. Loosen the securing nut.
2. Turn the top speed adjustment bolt COUNTERCLOCKWISE to reduce the speed.
3. Retighten the securing nut when adjustment is complete.

⚠ WARNING

DO NOT adjust the tractor for a faster overall speed forward or reverse than it was designed for.

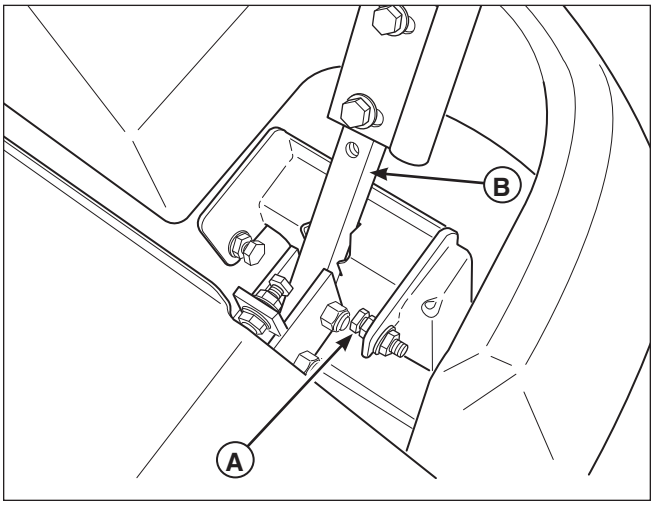


Figure 32. Top Speed Adjustment
A. Top Speed Adjustment Bolt
B. Control Lever Base

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NEUTRAL ADJUSTMENT

If the tractor “creeps” while the ground speed control levers are locked in NEUTRAL, then it may be necessary to adjust the linkage rod.
NOTE: Perform this adjustment on a hard, level surface such as a concrete floor.

1. Disengage the PTO, engage the parking brake and turn off the engine.
2. There are three nuts (B, Figure 33) on the linkage rod. The first two are to be used together to turn the rod and the third (towards the front of the machine) is used to lock the rod in place. Loosen the jam nut that locks against the ball joint (B, Figure 33) and turn the linkage rod (A) to adjust. If the machine creeps forward, turn the rod CLOCKWISE (while standing at the rear of the machine, facing forward), if the machine creeps backward, turn the rod COUNTER-CLOCKWISE.
3. Lock the jam nut (B) against the ball joint when neutral is achieved.

NOTE: This adjustment should not be performed while the machine is running. It may take several attempts to achieved neutral, depending upon how much the machine creeps.

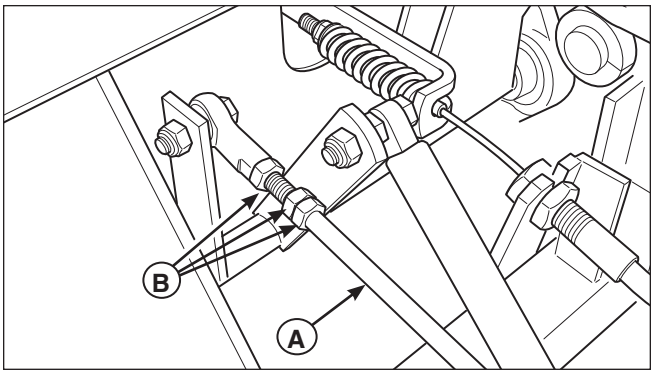


Figure 33. Neutral Adjustment (RH side shown)
A. Adjustment Linkage Rod
B. Nuts

RETURN-TO-NEUTRAL ADJUSTMENT

To determine if it is necessary to adjust the neutral return, perform the following steps.

1. Disengage the PTO, engage the parking brake and turn off the engine.
2. Move the ground speed control levers into the operating position, pull levers rearward and release.
3. Move the ground speed control levers out towards the neutral position. If the levers do not align with the notches in the neutral lock plate, it is necessary to adjust the neutral return rod.

TO ADJUST:

1. Loosen the set collar (B, Figure 34) locked against the return spring (A).
2. Lock the ground speed control levers in neutral.
3. Tighten set collar against the return spring.
4. Pull lever rearward and release to check that the lever stops aligned with notch in the neutral lock plate.

It is important to note that after every adjustment of the neutral return spring, the lever must be returned to locked position to properly check the neutral position.

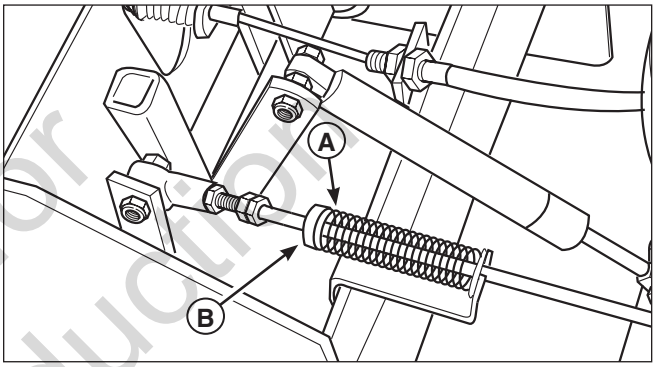


Figure 34. Return to Neutral Adjustment
A. Return Spring
B. Set Collar

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PARKING BRAKE ADJUSTMENT

1. Disengage the PTO, engage the parking brake, stop the engine and remove the ignition key.
2. Raise the seat plate.
3. Locate the brake spring (A, Figure 35).
4. With the parking brake engaged, measure the compressed spring length. The spring should be 1-15/16” - 2” (4,9 - 5,1 cm) when compressed.
5. If the spring is not within this range, release the parking brake and turn the adjustment nut (B) to compress or release the spring.
6. Engage the parking brake and remeasure the spring.

⚠ CAUTION

Do not adjust the spring to be shorter than 1-15/16” (4,9 cm) when compressed. This may damage the brake mechanism.

If this does not correct the braking problem, see your Ferris dealer.

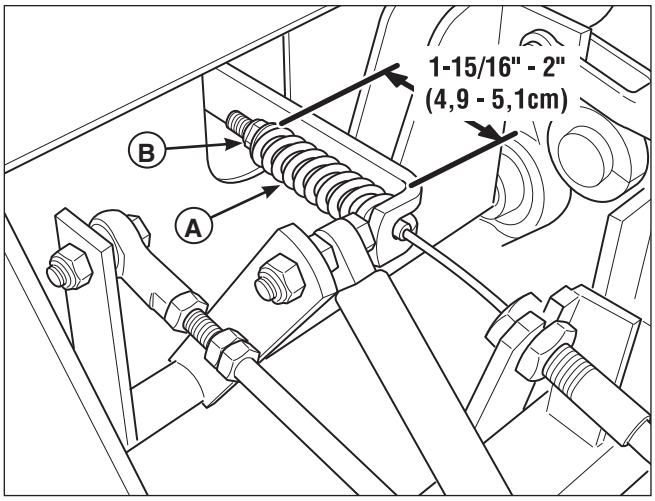


Figure 35. Parking Brake Adjustment
A. Brake Spring
B. Adjustment Nut

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REAR SUSPENSION ADJUSTMENT

The shock assembly can be adjusted in two ways to allow the operator to customize the ride according to operator's weight and/or operating conditions. You have the option of adjusting the spring pre-load and/or the upper mounting position.

Items to consider before adjusting the suspension.

- Less spring pre-load should be used with light weight operators, which will provide a softer, more cushioned ride.
- More spring pre-load or upper mounting position #2 should be used with heavy weight operators, or when a rear-mount grass bagger system is installed, which will provide a stiffer, more rigid ride.

To adjust the spring pre-load:

1. Park machine on a flat, level surface. Disengage the PTO, stop the engine and engage the parking brake.
2. Raise the rear of the machine and secure with jackstands. Chock the front wheels to prevent the machine from rolling.
3. Remove the rear drive tires.
4. See Figure 36. Using the supplied spanner wrench (p/n 5022853), insert the tip of the wrench into the notch in the pre-load adjuster. While holding the wrench in place with one hand, turn COUNTER-CLOCKWISE to increase the pre-load, turn CLOCKWISE to decrease the pre-load. Make sure both shocks are set to the same amount of pre-load.
5. Reinstall the rear drive tires. Torque the lug bolts to 85-95 ft/lbs. (115-129 Nm). Remove the jackstands from under the machine.

NOTE: Spanner wrench is located under the seat on the right-hand side of the machine.

NOTE: It is recommended that the rear suspension be adjusted stiffer due to the added weight of the collection system.

To adjust the upper mounting position:

1. Park machine on a flat, level surface. Disengage the PTO, stop the engine and engage the parking brake.
2. Raise the rear of the machine and secure with jackstands. The jackstands must under the bumper. Chock the front wheels to prevent the machine from rolling.
3. Position the jack under the cross member that ties the suspension arms together and slowly raise the rear suspension to relieve the pressure on the upper shock mounting bolts.

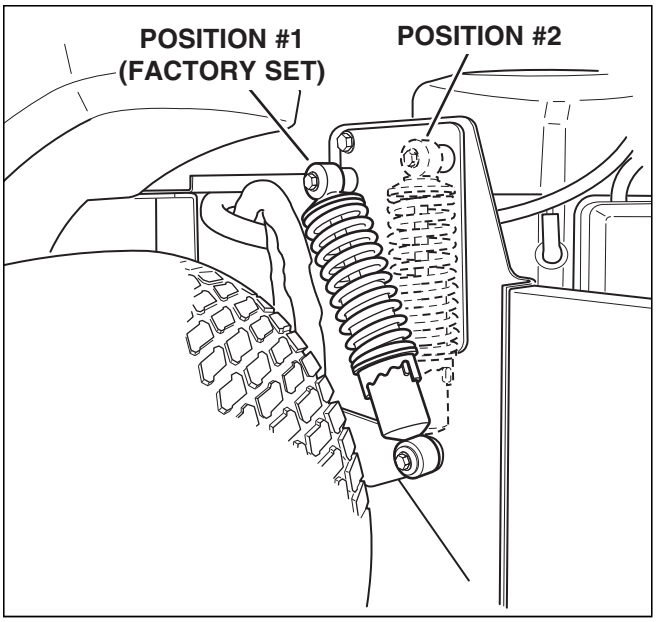


Figure 36. Rear Suspension Adjustments

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⚠ WARNING

Use two hands when adjusting the shock springs. This will prevent the wrench from slipping while pressure is being applied.

NOTE: This will require small adjustments to the jack's position. The shock should move freely on the mounting bolt when the pressure is relieved.

4. Remove the upper shock mounting hardware and pivot the shock to the position #2 (see Figure 36). Adjust the jack to align the shock mounts to the shocks.
5. Reinstall the upper shock mounting hardware and tighten securely.
6. Remove the jack from under the suspension cross member.
7. Remove the jackstands from under the machine.

MOWING HEIGHT ADJUSTMENT

The cutting height adjustment pin (A, Figure 37) controls the mower cutting height. The cutting height is adjustable between 1-3/4” (4,4 cm) and 5” (12,7 cm) in 1/4” (0,64 cm) increments.

1. Depress the deck lift foot pedal (B) until it locks into the 5” (12,7 cm) position.
2. Place the cutting height adjustment pin in the desired cutting height.
3. Depress the deck lift foot pedal then push the lock lever (C) towards the right to release the lock.
4. Release the deck lift foot pedal until it comes to rest against the cutting height adjustment pin.

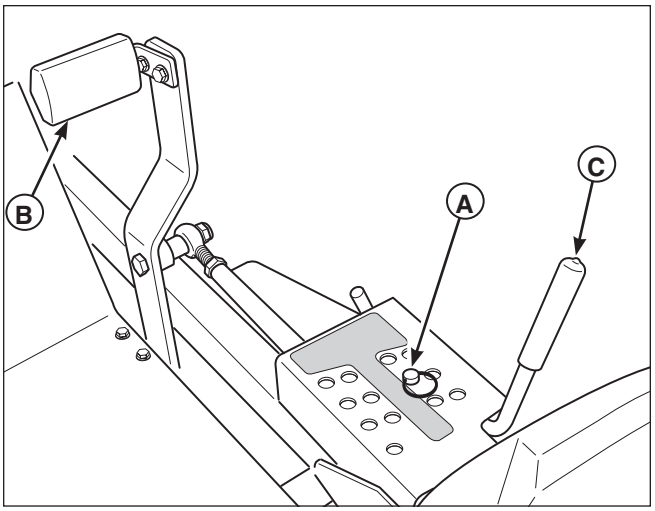


Figure 37. Mowing Height Adjustment
A. Cutting Height Adjustment Pin
B. Deck Lift Foot Pedal
C. Deck Lift Lock lever

FOOT PEDAL ADJUSTMENT

The deck lift foot pedal can be adjusted to accommodate the operator’s height for optimal comfort.

To adjust pedal position:

1. Remove the foot pedal (A, Figure 38) from the pedal mount tab (B).
2. Remove the pedal mount hardware (C) and rotate the tab 180 degrees.
3. Reinstall the pedal mount hardware and tighten securely.
4. Reinstall the foot pedal on the pedal mount tab in the proper orientation as shown in Figure 38.

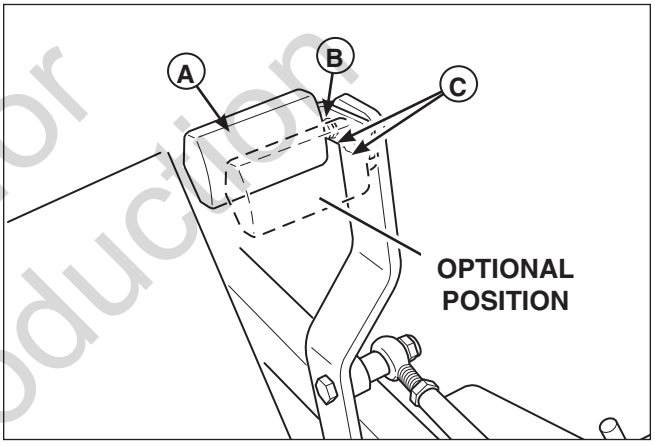


Figure 38. Foot Pedal Adjustment
A. Deck Lift Foot Pedal
B. Pedal Mount Tab
C. Pedal Mount Hardware

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DECK LIFT ROD TIMING ADJUSTMENT

1. Park machine on a flat, level surface. Disengage the PTO, stop the engine and engage the parking brake. Rear tires must be inflated to 15 psi (1,03 bar); front tires to 25 psi (1,72 bar).
2. To check the deck lift rod timing, measure and record the distance between the lift pivots and the rod pivots. Repeat for other side of unit. See Figure 39.
3. If the measurements are equal, skip to Step 5. If the measurements are NOT equal (greater than 1/8" (3,17mm) difference), adjustment is required, continue with Step 4.
4. Lock the deck lift pedal in the 5" (12,7 cm) position. Remove the cutting height adjustment pin and lower the mower deck.
5. To ensure that the deck is in the lowest position, push the pedal by hand towards the rear of the unit and install the height adjustment pin in the 3" (7.6cm) position to hold in place. See Figure 40.
6. Block up the mower deck until all hanger chains are slack. See Figure 41.
7. Refer to Figure 42. To adjust the inner lift rod, loosen the jam nut on the front ball joint then remove the 1/2" hardware fastening the ball joint the the lift pivot arm. Turn the ball joint clockwise to shorten the distance between the rod pivots or counterclockwise to lengthen the distance between the rod pivots. Reinstall the ball joint on the lift pivot arm and secure with the 1/2" hardware previously removed. Tighten the jam nut against the lift rod.
8. Remove blocks from under the mower deck.
9. Remove the the cutting height adjustment pin from in front of the deck lift pedal arm. Lift mower deck and reinstall adjustment pin in desired mowing height.

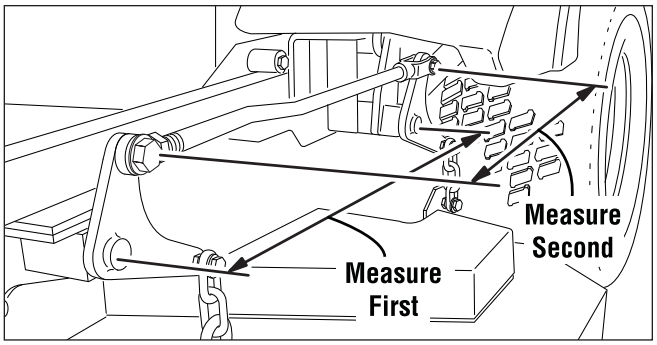


Figure 39. Check Lift Rod Timing

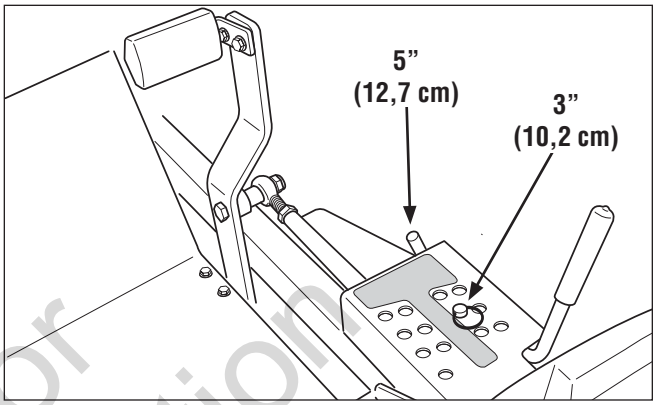


Figure 40. Deck Lift Pedal & Pin Position

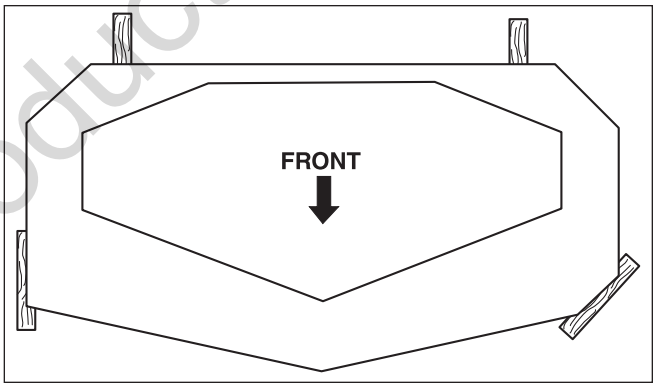


Figure 41. 2 x 4 Locations

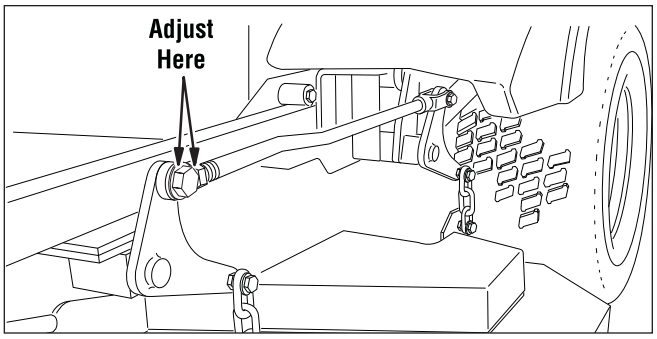


Figure 42. Adjust Lift Rod Timing

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DECK LEVELING ADJUSTMENT

NOTE: Before adjusting the deck level, the deck lift rod timing must be checked and/or adjusted.

Coarse Adjustment Procedure

When adjusting the deck level, the coarse adjustment procedure should be used to make the majority of the adjustment and the fine adjustment procedure should be used to complete the adjustment.

1. Park machine on a flat, level surface. Disengage the PTO, stop the engine and engage the parking brake. Rear tires must be inflated to 15 psi (1,03 bar); front tires to 25 psi (1,72 bar).
2. Lock the deck lift pedal in the 5" (12,7cm) position. Place the deck height adjustment pin in the 4" position and lower deck the lift pedal until the arm contacts the pin.
3. Place 2 x 4 blocks under each corner of the mower deck with the 3-1/2" sides being vertical. See Figure 43.
4. Loosen the nuts and allow the front of the deck to rest on the 2 x 4's. Slide the chains down in the slots until the chains are tight and tighten the nuts See Figure 44.
5. Loosen the nuts and allow the rear of the deck to rest on the 2 x 4's. Slide the chains down in the slots until the chains are tight and tighten the nuts. See Figure 44.
6. Remove all 2 x 4 blocks from under the mower deck.
7. **For your safety, DO NOT handle mower blades with bare hands.** Position the outside mower blades so that they face front-to-back (Figure 45).
8. Measure from the front tip of the blade from the cutting edge to the ground. Measure from the rear tip of the blade from the cutting edge to the ground. Repeat this process for the other side of the machine. The front and back measurements should be 4" (10,2 cm). If the measurements are greater than 1/8" (3,17 mm) of what they should be adjust the deck height until they are correct.

Fine Adjustment

1. Loosen the jam nut (A, Figure 46) and turn the fine adjustment bolt (B) to adjust the deck height until the front measurements equals 4" (10,2 cm). Turn the bolt CLOCKWISE to raise the deck; COUNTERCLOCKWISE to lower the deck.
2. Position the outside mower blades so they face front-to-back.
3. Remeasure the front tip of the blade from the cutting edge to the ground. Measure the rear tip of the blade from the cutting edge to the ground. Repeat the process for the other side of machine.
4. Once the measurement equals 4" (10,2 cm), retighten the jam nut.

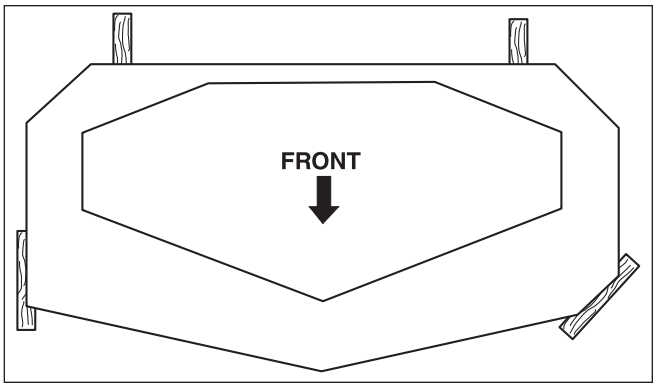


Figure 43. 2 x 4 Locations

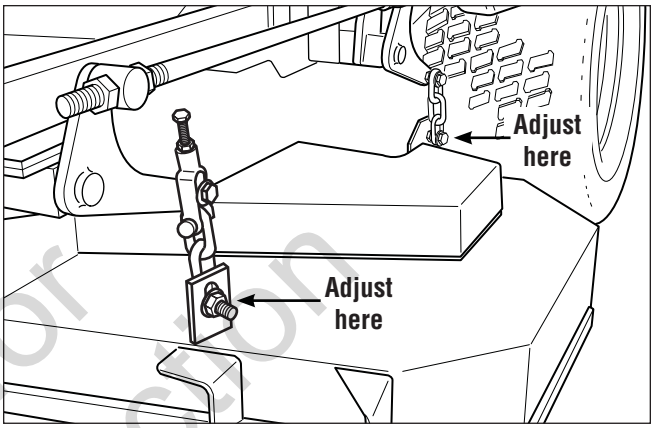


Figure 44. Hanger Chain Adjustment

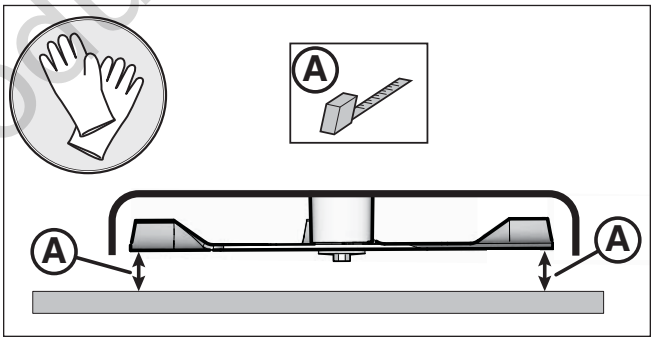


Figure 45. Checking The Blade Height Measurement

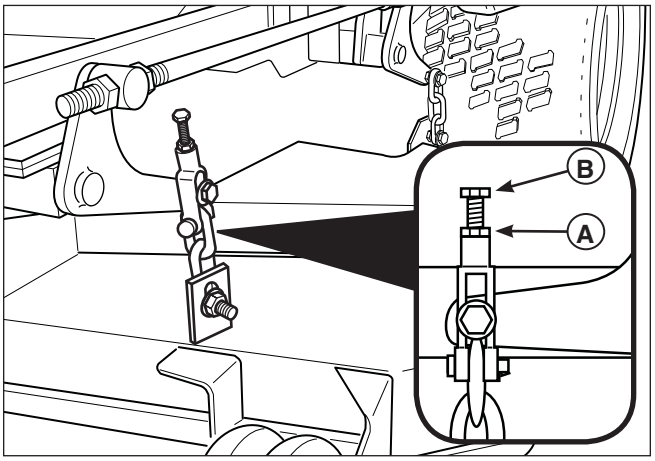


Figure 46. Fine Adjustment
A. Jam Nut
B. Fine Adjustment Bolt

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DECK LIFT SPRING

The deck lift springs (A, Figure 47) are factory set to provide optimal lifting performance.

Although it is fastened with a multi-position anchor, this is NOT AN ADJUSTMENT POINT.

DO NOT attempt to adjust the spring length or lifting performance will be compromised.

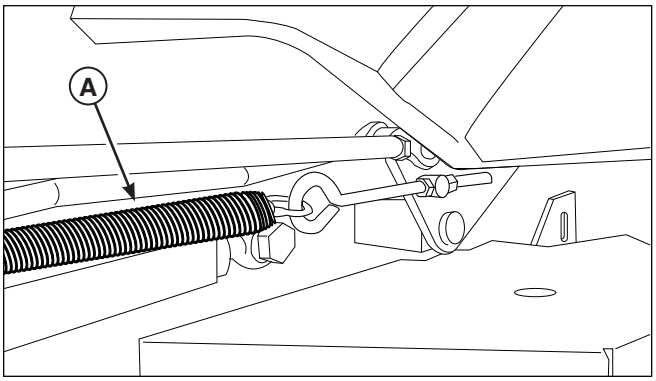


Figure 47. Deck Lift Spring Location
A. Deck Lift Spring

HYDRAULIC PUMP DRIVE BELT REPLACEMENT

1. Park the tractor on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
2. Remove the PTO drive belt (see MOWER BELT REPLACEMENT for removal instructions).
3. Remove the hardware that secures the clutch anchor pad to the PTO clutch.
4. Loosen the nut towards the front of the machine on the spring anchor hook (G, Figure 48) to release the majority of the belt tension. Use caution and remove the nut to completely release the tension.
5. Remove the old belt and replace it with a new one. Make sure the V-side of the belt runs in the grooves of the crankshaft pulley and pump pulleys (B & C).
6. Reinstall the anchor hook (G) into the anchor tab and loosely fasten the nut. Adjust the anchor hook until a measurement of 8-3/8" (21,2 cm) is achieved from the outside if the spring hooks. Tighten nut.
7. Reinstall the clutch anchor pad to the PTO clutch and secure with the hardware previously removed.
8. Reinstall the PTO drive belt.

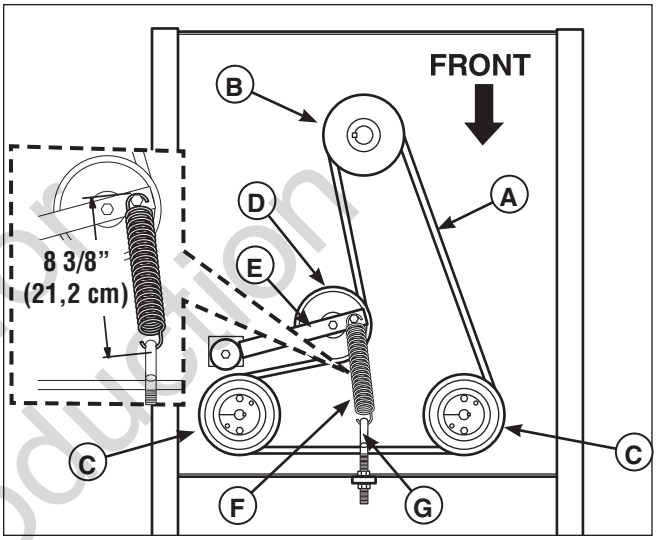


Figure 48. Hydraulic Pump Drive Belt Replacement
A. Pump Drive Belt
B. Crankshaft Pulley
C. Pump Pulley
D. Idler Pulley
E. Idler Arm
F. Spring
G. Spring Anchor Hook

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MOWER BELT REPLACEMENT

To avoid damaging belts, DO NOT PRY BELTS OVER PULLEYS.

1. Park the tractor on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
2. Using a 1/2” breaker bar, place the square end in the square hole located in the end of the idler arm (A, Figures 49). Carefully rotate the breaker bar counter-clockwise, which will relieve the tension on the belt exerted from the idler arm.
3. Slide the drive belt over the edge of the stationary idler pulley (B). Carefully release the tension on the breaker bar until the idler arm stops against the center spindle pulley.

⚠ WARNING

Use extreme caution when rotating the idler arm with the breaker bar, due to the increased tension in the spring as the idler arm is being rotated. Injury may result if the breaker bar is prematurely released while the spring is under tension.

4. Remove the old belt and replace with a new one. Make sure the V-side of the belt runs in the pulley grooves (Figure 50).
5. Install the drive belt on the PTO pulley, the spindle pulleys and all idler pulleys except the stationary pulley (B, Figure 49). Carefully rotate the breaker bar counter-clockwise and install the belt on the stationary idler pulley (B). Carefully release the tension on the breaker bar.
6. Run the mower under no-load condition for about 5 minutes to break-in the new belt.

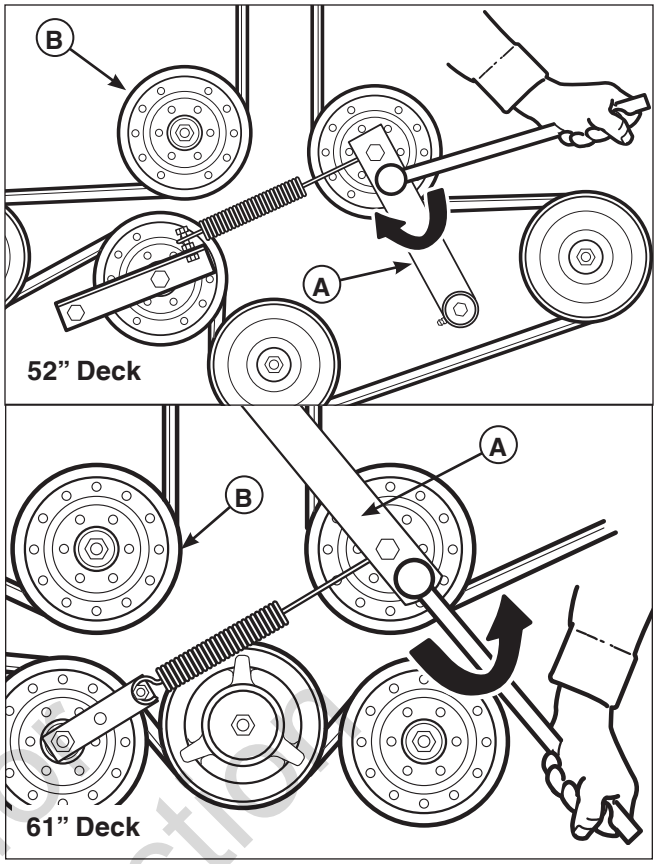


Figure 49. Mower PTO Belt
A. Idler Arm
B. Stationary Idler Pulley

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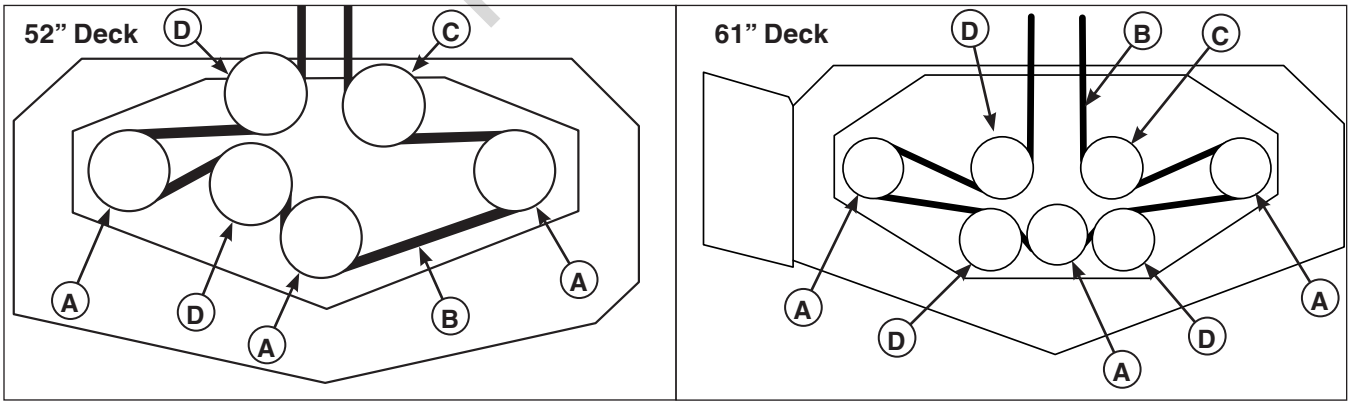


Figure 50. Mower PTO Belt Routing
A. Spindle Pulley
B. PTO Drive Belt
C. Spring-loaded Idler Pulley
D. Stationary Idler Pulley

Check the Mower Belt Idler Tensioner Spring Length

1. Park the machine on a smooth level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine and remove the ignition key.
2. Lower the mower deck to its lowest cutting position.
3. Use the Mower Belt Idler Spring Length chart to determine the correct spring length.
4. Measure the coil length of the mower belt tension spring (A, Figure 50). The measurement should equal the measurement as designated in the chart. If the measurement does not equal the measurement as designated in the chart, adjust the anchor eyebolt (B).

Adjusting the Mower Belt Idler Spring Length

1. Loosen the jam nut (C, Figure 50).
2. Turn the adjustment nut (D) until the measurement as designated in the chart is achieved.
3. Retighten the jam nut.

Mower Belt Idler Spring Length		
Deck Size	Measurement	
	inch	cm
52”	7”	17,8
61”	6-1/2”	16,5

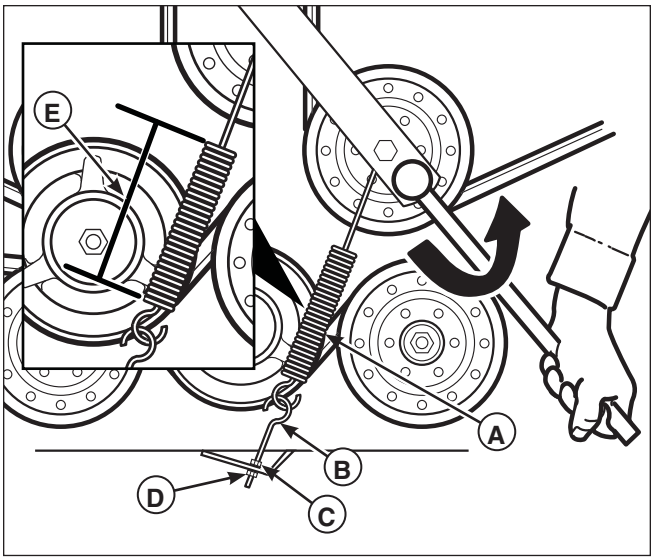


Figure 51. Mower Belt Idler Spring Length
A. Mower Belt Tensioner Spring
B. Anchor Eyebolt
C. Jam Nut
D. Adjustment Nut
E. Measurement

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BATTERY SERVICE

⚠ WARNING

Keep open flames and sparks away from the battery; the gasses coming from it are highly explosive.Ventilate the battery well during charging.

Checking Battery Voltage

A voltmeter can be used to determine condition of battery. When engine is off, the voltmeter shows battery voltage, which should be 12 volts.When engine is running, the voltmeter shows voltage of charging circuit which normally is 13 to 14 volts. A dead battery or one too weak to start the engine may not mean the battery needs to be replaced. For example, it may mean that the alternator is not charging the battery properly. If there is any doubt about the cause of the problem, see your dealer. If you need to replace the battery, follow the steps under Cleaning the Battery & Cables in the Regular Maintenance Section.

Charging a Completely Discharged Battery

1. Be aware of all the safety precautions you should observe during the charging operation. If you are unfamiliar with the use of a battery charger and hydrometer, have the battery serviced by your dealer.
2. Add distilled water sufficient to cover the plate (fill to the proper level near the end of the charge). If the battery is extremely cold, allow it to warm before adding water because the water level will rise as it warms. Also, an extremely cold battery will not accept a normal charge until it becomes warm.
3. Always unplug or turn the charger off before attaching or removing the clamp connections.
4. Carefully attach the clamps to the battery in proper polarity (usually red to [+] positive and black to [-] negative).
5. While charging, periodically measure the temperature of the electrolyte. If the temperature exceeds 125° F (51.6° C), or if violent gassing or spewing of electrolyte occurs, the charging rate must be reduced or temporarily halted to prevent battery damage.
6. Charge the battery until fully charged (until the specific gravity of the electrolyte is 1.250 or higher and the electrolyte temperature is at least 60° F). The best method of making certain a battery is fully charged, but not over charged, is to measure the specific gravity of a cell once per hour. The battery is fully charged when the cells are gassing freely at low charging rate and less than 0.003 change in specific gravity occurs over a three hour period.

Jump Starting With Auxiliary (Booster) Battery

Jump starting is not recommended. However, if it must be done, follow these directions. Both booster and dis-charged batteries should be treated carefully when using jumper cables. Follow the steps below EXACTLY, being careful not to cause sparks. Refer to Figure 51.

1. Both batteries must be of the same voltage.
2. Position the vehicle with the booster battery adjacent to the vehicle with the discharged battery so that booster cables can be connected easily to the batteries in both vehicles. Make certain vehicles do not touch each other.
3. Wear safety glasses and shield eyes and face from batteries at all times. Be sure vent caps are tight. Place damp cloth over vent caps on both batteries.
4. Connect positive (+) cable to positive post of discharged battery (wired to starter or solenoid).
5. Connect the other end of same cable to same post marked positive (+) on booster battery.
6. Connect the second cable negative (-) to other post of booster battery.
7. Make final connection on engine block of stalled vehicle away from battery. Do not lean over batteries.
8. Start the engine of the vehicle with the booster battery.Wait a few minutes, then attempt to start the engine of the vehicle with the discharged battery.
9. If the vehicle does not start after cranking for thirty seconds, STOP PROCEDURE. More than thirty seconds seldom starts the engine unless some mechanical adjustment is made.
10. After starting, allow the engine to return to idle speed. Remove the cable connection at the engine or frame. Then remove the other end of the same cable from the booster battery.
11. Remove the other cable by disconnecting at the discharged battery first and then disconnect the opposite end from the booster battery.
12. Discard the damp cloths that were placed over the battery vent caps.

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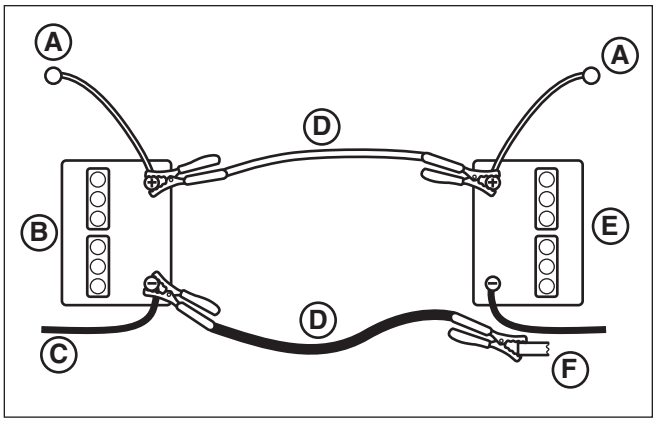


Figure 52. Jump Starting

This hook-up is for negative grounded vehicles.	
Callout	**Description**
A	To Starter Switch
B	Starting Vehicle Battery
C	To Ground
D	Jumper Cable
E	Discharged Vehicle Battery
F	Engine Block
Make sure vehicles do not touch.	

⚠ WARNING

Any procedure other than the preceding could result in:

(1) personal injury caused by electrolyte squirting out the battery vents,

(2) personal injury or property damage due to battery explosion,

(3) damage to the charging system of the booster vehicle or of the immobilized vehicle.

Do not attempt to jump start a vehicle having a frozen battery because the battery may rupture or explode. If a frozen battery is suspected, examine all fill vents on the battery. If ice can be seen or if the electrolyte fluid cannot be seen, do not attempt to start with jumper cables as long as the battery remains frozen.

⚠ WARNING

For your personal safety, use extreme care when jump starting. Never expose battery to open flame or electric spark – battery action generates hydrogen gas which is flammable and explosive. Do not allow battery acid to contact skin, eyes, fabrics, or painted surfaces. Batteries contain a sulfuric acid solution which can cause serious personal injury or property damage.

When removing or installing battery cables, disconnect the negative cable FIRST and reconnect it LAST. If not done in this order, the positive terminal can be shorted to the frame by a tool.

To avoid engine damage, do not disconnect battery while engine is running. Be sure terminal connections are tight before starting.

SPECIFICATIONS

NOTE: Specifications are correct at time of printing and are subject to change without notice.

ENGINE:

22HP* Kawasaki

Make	Kawasaki
Model	FH651V
Horsepower	22 @ 3600 rpm
Displacement	44.3 Cu. in (726 cc)
Electrical System	12 Volt, 13 amp. Alternator, Battery: 340 CCA
Oil Capacity	2.2 US Qt. (2.1 L) w/ Filter

23HP* Kawasaki

Make	Kawasaki
Model	FS691V-ES00-S
Horsepower	23 @ 3600
Displacement	44.3 Cu. In (726 cc)
Electrical System	12 volt, 15 amp charging coil; Battery: 340 cca
Oil Capacity	2.2 US qt (2.1 L) w/ filter

24HP* Kawasaki

Make	Kawasaki
Model	FS730V-ES00-S
Horsepower	24 @ 3600
Displacement	44.3 cu in. (726 cc)
Electrical System	12 volt, 15 amp charging coil; Battery: 340 cca
Oil Capacity	2.2 US qt. (2.1 L) w/ filter

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26HP* Kawasaki

Make	Kawasaki
Model	FX730V-AS00-S
Horsepower	26 @ 3600 rpm
Displacement	44.30 Cu. in (726 cc)
Electrical System	12 Volt, 15 amp. Alternator, Battery: 340 CCA
Oil Capacity	2.2 qt. (2.1 L) w/ Filter

26HP** Briggs & Stratton Cyclonic

Make	Briggs & Stratton
Model	44P977-0111-G5
Horsepower	26 @ 3600
Displacement	44.2 Cu. In (724 cc)
Electrical System	12 volt, 16 amp alternator; Battery: 340 CCA
Oil Capacity	2.0 US qt. (1.9 L) w/ filter

28HP** Briggs & Stratton Vanguard

Make	Briggs & Stratton
Model	541777-0110-E1
Horsepower	28 @ 3600 rpm
Displacement	54.68 Cu. in (896 cc)
Electrical System	12 Volt, 20 amp. Alternator, Battery: 340 CCA
Oil Capacity	2.4 qt. (2.25 L) w/ Filter

28HP** Briggs & Stratton Cyclonic

Make	Briggs & Stratton
Model	49L977-0125-G5
Horsepower	28 @ 3600
Displacement	49.43 Cu. in (810 cc)
Electrical System	12 volt, 16 amp. Alternator; Battery: 340 cca
Oil Capacity	2.1 US qt. (2.0 L) w/ filter

CHASSIS:

Fuel Tank Capacity:	6 Gallons (22,7 L) Total
Rear Wheels	Tire Size: 22 x 11.00 -10
Inflation Pressure:	15 psi (1,03 bar)
Front Wheels	Tire Size: 13 x 5.00 - 6
Inflation Pressure:	25 psi (1,72 bar)

TRANSMISSIONS:

S/N: 2014450933 & Below

LH Wheel Motor: HGM-15E-3138 (5100407)
Pump: PJ-3HBQ-FV1F-XXXX (5100670)

RH Wheel Motor: HGM-15E-3132 (5100410)
Pump: PJ-3KBQ-FV1F-XXXX (5100671)

S/N: 2014450934 - 2014516987

LH Wheel Motor: HGM-15E-3138 (5100407)
Pump: PK-3HBQ-FV1F-XXXX (5102174)

RH Wheel Motor: HGM-15E-3132 (5100410)
Pump: PK-3KBQ-FV1F-XXXX (5102175)

S/N: 2014516988 & Above

LH Wheel Motor: TF0240LS080AAKZ (5102682)
Pump: PK-3HBQ-FV1F-XXXX (5102174)

RH Wheel Motor: TF0240LS081AAKZ (5102681)
Pump: PK-3KBQ-FV1F-XXXX (5102175)

Type	Pump and Wheel Motor
Hydraulic Fluid	Mobil 1™ 15W-50 synthetic oil or Castrol Syntec™ 5W-50 oil
Speeds	Forward: 0-10 MPH (0-16.09 km/h)
@ 3400 rpm	Reverse: 0-5 MPH (0-8.05 km/h)
Continuous Torque Output	222 ft. lbs. (301 N.m.)
Maximum Weight on Axle	750 lbs. (340 Kg)

DIMENSIONS:

Overall Length	81” (208 cm)
Overall Width	65” (165 cm) - 52” Deck 72” (183 cm) - 61” Deck
Height	70” (178 cm) with Roll Bar Up 59” (150 cm) with Roll Bar Down
Weight (apx..)	
With 52” Mower Deck	1012 lbs (459 kg)
With 61” Mower Deck	1222 lbs. (554 kg)

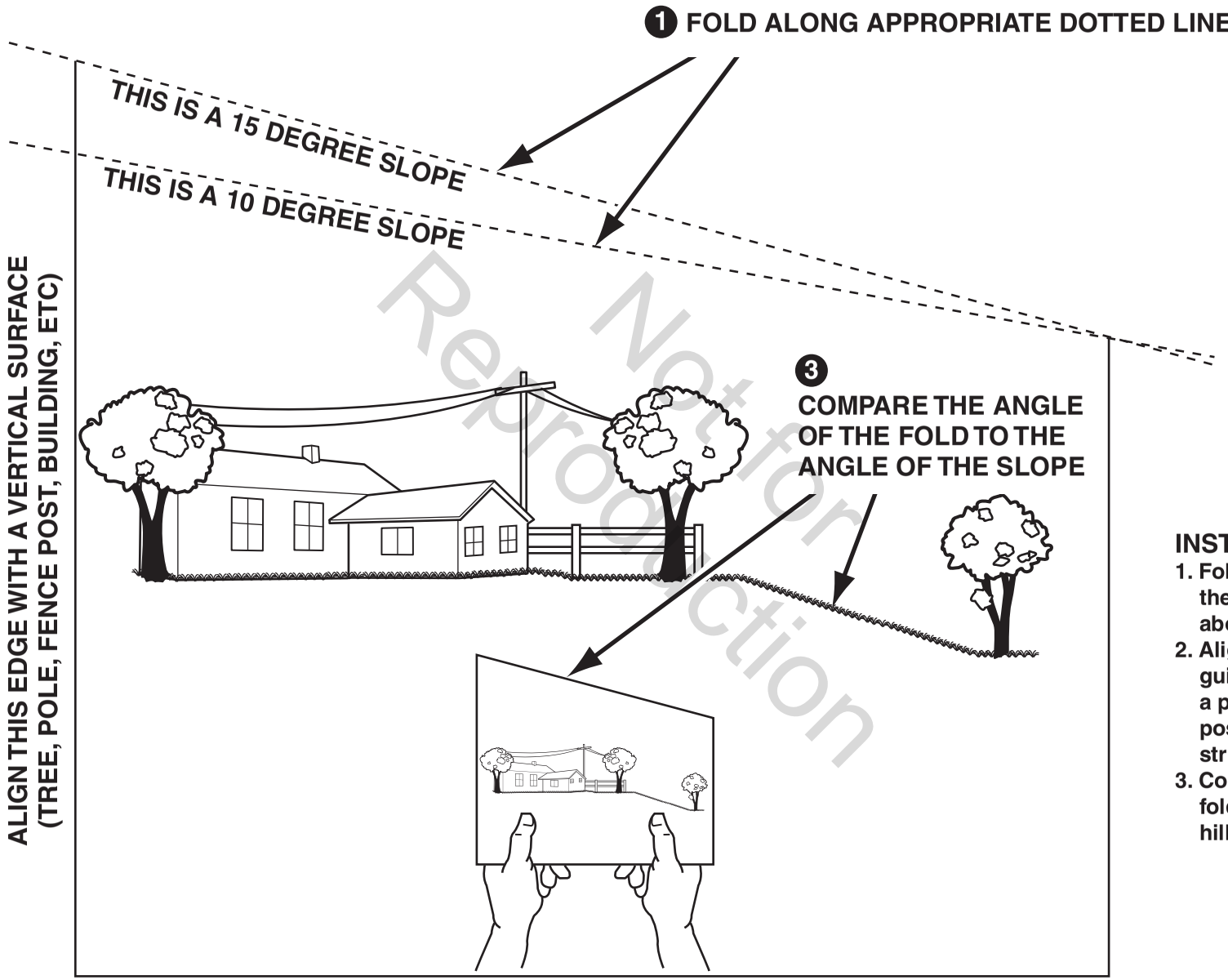
*Actual sustained equipment horsepower will likely be lower due to operating limitations and environmental factors.

****Power Rating**

The gross power rating for individual gas engine models is labeled in accordance with SAE (Society of Automotive Engineers) code J1940 (Small Engine Power & Torque Rating Procedure), and rating performance has been obtained and corrected in accordance with SAE J1995 (Revision 2002-05). Torque values are derived at 3060 RPM; horsepower values are derived at 3600 RPM. Net power values are taken with exhaust and air cleaner installed whereas gross power values are collected without these attachments. Actual gross engine power will be higher than net engine power and is affected by, among other things, ambient operating conditions and engine-to-engine variability. Given the wide array of products on which engines are placed, the gas engine may not develop the rated gross power when used in a given piece of power equipment. This difference is due to a variety of factors including, but not limited to, the variety of engine components (air cleaner, exhaust, charging, cooling, carburetor, fuel pump, etc.), application limitations, ambient operating conditions (temperature, humidity, altitude), and engine-to-engine variability. Due to manufacturing and capacity limitations, Briggs & Stratton may substitute an engine of higher rated power for this Series engine.

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SLOPE INDENTIFICATION GUIDE



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INSTRUCTIONS

1. Fold this page along the dotted line indicated above.
2. Align the left edge of this guide with a vertical tree, a power line pole, a fence post, or any vertical structure.
3. Compare the angle of the fold with the angle of the hill.

Ferris Industries - a division of Briggs & Stratton Power Products Group, LLC.
Owner's Limited Warranty Information

(Effective 04/28/2004)

Thank you for purchasing Ferris commercial mowing equipment. Please take a few minutes to read this limited warranty information. It contains all the information you will need to have your Ferris mower repaired in the unlikely event that a breakdown covered by this limited warranty should occur.

Owner's Responsibilities - As a condition to our obligations under this limited warranty, you shall have read the operator's manual and you shall have completed and submitted to Ferris, within 20 days from the date of purchase, the Ferris Product Registration. You must properly service and maintain your Ferris product as described in the operator's manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense. The Ferris equipment, including any defective part covered by this limited warranty, must be returned to an authorized Ferris dealer within the warranty period for warranty service. This limited warranty extends only to equipment operated under normal conditions and in accordance with Ferris' instructions.

Warranty Start Date - The limited warranty coverage begins on the day you buy your new Ferris commercial mowing equipment. An authorized Ferris dealer will assist you in filling out a Ferris Product Registration with specific information for the model you purchase and your personal information, which must be returned to Ferris.

Limited Warranty - The limited warranty, set forth below, is a written guarantee by Ferris, during the warranty period, to repair or replace parts which have a substantial defect in materials or workmanship. The warranty is "limited" because it is for a specified period of time, applies to the original purchaser only, and is subject to other restrictions.

FERRIS LIMITED WARRANTY

Ferris Industries (Ferris) warrants, in accordance with the provisions below, to the original purchaser only, for the periods described below that the commercial mower shall be free from substantial defects in material or workmanship under normal use and service. If you wish to file a claim under this limited warranty, you must provide prompt notice of your claim to an authorized Ferris dealer during the warranty period. Ferris' obligation under this limited warranty is, at Ferris' option, to repair or replace any part or parts of the mower, which, in the judgment of Ferris, are found to be defective and covered by this limited warranty. An authorized Ferris dealer will repair or replace the defective part or parts, at the dealer's place of business, at no charge for the labor or parts. This limited warranty applies only to mowers sold in the United States and Canada and is subject to the following limitations.

Covered Parts	**Warranty Period**
All Mowers	2-years (24 months) from date of retail purchase by the original purchaser for parts & labor (90 days for rental mowers) (Except as noted below*)
*Belts, Tires, Brake Pads And Hoses, Battery, Blades	90 days from date of retail purchase by the original purchaser
*Attachments	1 year from date of retail purchase by the original purchaser
*Engine	If the engine manufacturer provides any warranty on the mower's engine, Ferris will assign that warranty to the original purchaser of the mower if such assignment is reasonably practicable. Please refer to the engine manufacturer's warranty statement, if any, that is included in the owner's packet. We are not authorized to handle warranty adjustments or repairs on engines. Ferris offers **NO WARRANTY** on mower engines. Ferris does not guarantee or represent that any engine manufacturer will comply with the terms of its warranty.

Items and Conditions Not Covered

This warranty does not cover, and Ferris makes **NO WARRANTY** regarding, the following:

- Mowers or their parts if a complete and accurate Ferris Product Registration has not been received by Ferris.
- Loss or damage to person or property other than that expressly covered by the terms of this limited warranty.
- Pickup and delivery charges and risk of loss or damage in transit to and from any authorized Ferris dealer.
- Any damage or deterioration due to normal use, wear and tear, or environmental or natural elements, or exposure.
- Cost of regular maintenance service or parts, such as but not limited to, filters, fuel, lubricants, tune-up parts, and adjustments.
- Claims arising due to failure to follow Ferris' written instructions, or improper storage or maintenance.
- Any repairs necessary due to use of parts, accessories or supplies, including gasoline, oil or lubricants, incompatible with the mowing equipment, or other than as recommended in the operator's manual or other written operational instructions provided by Ferris.
- Use of non-Ferris approved parts or accessories.
- Any overtime or other extraordinary repair charges or charges relating to repairs or replacements.
- Rental of like or similar replacement equipment during the period of any warranty, repair or replacement work.
- Loss of revenue, time or use of the mowing equipment.
- Travel, telephone or other communication charges.
- Damage from continued use of defective mowing equipment.
- Freight charges on replacement parts.
- Any mowing equipment or part which, in the judgment of Ferris, has been altered or tampered with in any way or has been subjected to misuse, abuse, abnormal usage, unauthorized repair, neglect or accident, damage in transit, or has had the serial numbers altered, effaced or removed.
- Any equipment, part or item not mentioned under "Covered Parts," above.

General Conditions

Ferris is continually striving to improve its products, and therefore reserves the right to make improvements or changes without incurring any obligation to make changes or additions to products sold previously. Any oral or written description of Ferris products is for the sole purpose of identifying the products and shall not be construed as an express warranty. No warranty claim shall give rise to a right for the purchaser to cancel or rescind any sale. No person is authorized to make any warranty or assume for Ferris any liability not strictly in accordance with this limited warranty. Any assistance Ferris provides to or procures for the purchaser outside the terms, limitations or exclusions of this limited warranty will not constitute a waiver of the terms, limitations or exclusions of this limited warranty, nor will such assistance extend or revive the limited warranty. Ferris will not reimburse the purchaser for any expenses incurred by the purchaser in repairing, correcting or replacing any defective products except for those incurred with Ferris' prior written permission and in accordance with this limited warranty.

Ferris' sole and exclusive liability with respect to this limited warranty, and the purchaser's exclusive remedy, shall be repair or replacement as set forth herein. All warranty work must be performed by an authorized Ferris dealer using only Ferris approved replacement parts. **FERRIS SHALL HAVE NO LIABILITY FOR ANY OTHER COST, LOSS OR DAMAGE, INCLUDING BUT NOT LIMITED TO, ANY INCIDENTAL, COMPENSATORY, INDIRECT, PUNITIVE, SPECIAL OR CONSEQUENTIAL LOSS OR DAMAGE. FERRIS' AGGREGATE LIABILITY WITH RESPECT TO A DEFECTIVE PRODUCT OR PART SHALL BE LIMITED TO AN AMOUNT EQUAL TO THE MONIES PAID BY THE PURCHASER FOR THAT DEFECTIVE PRODUCT OR PART. THIS LIMITED WARRANTY, AND FERRIS' OBLIGATIONS HEREUNDER, ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. FERRIS SHALL NOT BE LIABLE TO THE PURCHASER, OR TO ANYONE CLAIMING UNDER THE PURCHASER, FOR ANY OTHER OBLIGATIONS OR LIABILITIES, INCLUDING, BUT NOT LIMITED TO, OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE OR OTHER TORT OR ANY THEORY OF STRICT LIABILITY, WITH RESPECT TO FERRIS PRODUCTS OR FERRIS' ACTS OR OMISSIONS OR OTHERWISE.**

It is the express wish of the parties that this agreement and any related documents be drafted in English. Il est la volonté expresse des parties que cette convention et tous les documents s'y rattachent soient rédigés en anglais.

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FERRIS®

OPERATOR'S MANUAL

IS1500ZX Series

Zero-Turn Riding Mower

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MUNNSVILLE, NY 13409
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